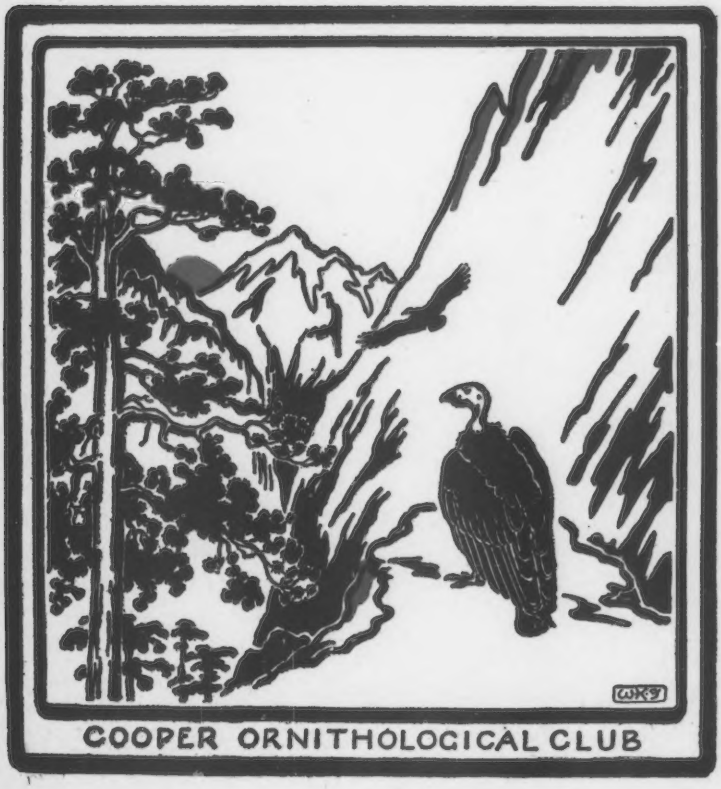
THE CONDOR

A Magazine of Western Ornithology

Volume XXIX November-December, 1927 Number 6



COOPER ORNITHOLOGICAL CLUB

THE CONDOR

A Magazine of Western Ornithology

Published Bi-monthly by the Cooper Ornithological Club

Entered as second-class matter May 15, 1925, at the post-office at Berkeley, California, under Act of Congress of February 28, 1925, Section 412, paragraph 4.

Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.
Fifty Cents the single copy.
Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

Send manuscripts for publication to the Editor, J. GRINNELL, Museum of Vertebrate Zoology, University of California, Berkeley, or to the Associate Editor, H. S. SWARTH, California Academy of Sciences, San Francisco.

Send dues, subscriptions, orders for back numbers of THE CONDOR and for the PACIFIC COAST AVIFAUNA series to the Business Managers, W. LEE CHAMBERS, Box 123, Eagle Rock, California, or HARRY HARRIS, Box 123, Eagle Rock, California.

Endowment Secretary, D. R. DICKEY, 514 Lester Avenue, Pasadena, California.

Issued November 15, 1927

CONTENTS

The American Gull-billed Tern Breeding in California (with five ills.) ..... *J. R. Pemberton* 253

The California Clapper Rail, Its Nesting Habits, Enemies and Habitat ..... *Dudley Sargent De Groot* 259

FROM FIELD AND STUDY

A Commensal Relation of the California Quail with the California Ground Squirrel ..... *E. Raymond Hall* 271

Western Wood Pewees and Dwarf Cowbirds Nesting in San Diego ..... *Frank F. Gander* 271

Black Bear Tries to Gnaw into a Woodpecker's Nest ..... *Joseph Dixon* 271

Another Man-o'-war-bird Wanders into Californian Waters ..... *Clinton G. Abbott* 272

Analysis of Sexes in a Junco Migration ..... *Thomas T. McCabe* and *Elinor Bolles McCabe* 272

Road-runner versus Mockingbird ..... *Robert S. Woods* 273

A Further Chronicle of the Passenger Pigeon and of Methods Employed in Hunting It ..... *Annie M. Alexander* 273

The Amount of Food Consumed by Cormorants ..... *A. Wetmore* 273

The Rufous-necked Sandpiper in Alaska ..... *H. S. Swarth* 274

The Barn Owl in its Relation to the Rodent Population at Berkeley, California ..... *E. Raymond Hall* 274

Notes from the Three Barkerville Banding Stations ..... *Harold Michener* 275

EDITORIAL NOTES AND NEWS 276

PUBLICATIONS REVIEWED—Henderson's "Practical Value of Birds" ..... *J. Grinnell* 276

MINUTES OF COOPER CLUB MEETINGS 277

INDEX TO VOLUME XXIX 279

THE CONDOR

A Bi-Monthly Magazine of
Western Ornithology
Published by the
Cooper Ornithological Club

VOLUME XXIX NOVEMBER-DECEMBER, 1927 NUMBER 6

THE AMERICAN GULL-BILLED TERN BREEDING IN CALIFORNIA

WITH FIVE ILLUSTRATIONS

By J. R. PEMBERTON

THE American Gull-billed Tern *(Gelochelidon nilotica aranea)* is a bird chiefly of the Gulf coast of the southern United States and Mexico and of the southern Atlantic coast as far north as Virginia. It also breeds on some of the Bahama Islands and Cuba. It has always been found in a salt-water association and never, so far as I know, inland. There is no published or known unpublished record of the bird ever having been found in the breeding season away from the Atlantic coast and its immediately adjacent tide-waters.

It is therefore with great pleasure that I announce the discovery of a large colony of these birds breeding on some small islands in the Salton Sea, Imperial County, California. To Mr. Ozra W. Howard the principal credit for this discovery should go. Mr. Howard is known to Cooper Club members as one of the best posted men in southern California on the breeding grounds and habits of our southern birds. He is indefatigable in running to ground rumors which may lead to new discoveries. Early this spring he asked me to accompany him on a trip to the Salton Sea to look into the identity of some terns which had been reported to him by natives as breeding there.

Accordingly, on May 20, 1927, Howard and I, accompanied by J. Stuart Rowley, arrived about midnight at the home of a friend of Howard. Early the next morning we were out in the tules and willows where we found a multitude of water birds. Black-necked Stilts, Avocets, White-faced Glossy Ibises, Coots, Fulvous Tree-ducks, Redheads, Shovellers, Mallards, Pintails, White Pelicans and Killdeers were noted in varying degrees of abundance; while Ruddy Ducks, Eared Grebes, and Black and Forster terns were now and then seen. We were keenly on the alert for Roseate Spoonbills *(Ajaia ajaja)*, and the next day Howard discovered a single bird wading in shallow water in company with ibises and avocets. This bird was collected by Rowley and is now no. 588 in his collection at Alhambra, California. This is apparently the first specimen of this species ever actually taken in California. It proved to be an immature male in probably its second year.

We soon got into boats and made our way a couple of leagues to a small sand island where the White Pelicans *(Pelecanus erythrorhynchos)* were nesting. There proved to be by actual count 350 occupied nests, each containing from one to four eggs. Incubation had not progressed very far, even in the sets of three and four. On two other nearby islands were two additional colonies; the 50 occupied nests in each brought the total number of breeding pelicans to 450 pairs. It is likely, judging from the relatively large number of nests containing only a single egg each, that many

pairs of the birds had not yet laid; and I believe it safe to say that there are at least 500 pairs of breeding pelicans this year on Salton Sea. Grinnell (CONDOR, X, 1908, p. 187) in April, 1908, found 1000 pairs of these birds in the same locality. The nests were simple scoops in the dry sand with a scanty, raked-up rim of dry salt grass and twigs surrounding the shallow depression. The spacing between the nests ranged from four to ten feet.

Before we reached the pelican colony Caspian Terns *(Sterna caspia imperator)* had been noted in small numbers; and a few nests containing one and two eggs were found on a very small sand island. A bad storm of the preceding week had washed away a large part of this island and many nests had been ruined. It is believed that this colony is the southernmost known in the State, two other colonies being known in the middle of California. We found, all told, about a dozen pairs of this bird.

While rowing the boats toward the pelican colony I noted singles and pairs of terns at a distance, which I mentally considered to be Forster Terns. While we were

Fig. 78. WHITE PELICANS RISING FROM THEIR NESTS; SALTON SEA, CALIFORNIA, MAY 21, 1927.

walking on the small island where the Caspian Terns were breeding I first became aware that these small terns were Gull-billed. Neither Howard nor Rowley were acquainted with this species, but we all felt certain that the bird was a new one for California. Rowley collected several of them and one pair, a gift from Mr. Rowley, now reposes in the Museum of Vertebrate Zoology as nos. 50668 and 50669.

The terns were flying in a bee line for some distant spot, and the fact that some of them carried small fishes in their beaks convinced me that we were soon to make the discovery of a breeding colony. My experience with this species in Texas had taught me that the surest and best way of finding the breeding ground was to follow birds carrying fishes. So we hurriedly got into the boats and away on a long pull

toward a dim point of land too far off mid the heat waves to be studied even with a good pair of binoculars. At length the boats drew near the point, which turned out to be an island, and the terns, even as in Texas, came out to meet us with discordant and grating screeches, while over the center of the island were hundreds of hovering birds. We beached the boats and were soon walking up the slope of the island and among the nests.

The nests and eggs of the Gull-billed Tern proved rather hard to find until a person was within a few yards distance, when they became very obvious. The eggs were nearly the same color as the brown sand on which they lay, and the nests were depressions in which the eggs were partially hidden, as a result of which the most careful search was needed to locate all the nests. The nests contained from one to four eggs each, with the exception of one nest which held a single young bird perhaps only a day old. Incubation was far advanced in most of the full sets of three and four (only one nest contained four eggs), but nests containing one or two eggs held incomplete sets in some cases.

All the nests were depressions in the caked sand and many of them must have been made by the birds. The sand of these islands is wind-blown dune sand, but it

Fig. 79. NEST AND EGGS OF THE CASPIAN TERN; SALTON SEA, MAY 21, 1927.

has become incrusted to a depth of an inch or two by salt which has been left after evaporation of spray blown over the sand in periods of strong winds. The severity of the winds I believe to be the most serious obstacle met by these birds in nesting here. The scouring action along the sides of, and off the breast of, the sitting bird was sufficient in many cases to wear deep grooves in the sand. Many eggs were found at random places about the island, these having doubtless been blown from the nests. Some 25 dead birds were found, and we believed they had been killed by exposure to the severe wind.

We found three groups of nests, each upon a separate island. All of these islands, situated close together, were separated from the mainland by deep water, and I assume that roving coyotes do not molest these birds. There were by actual count

in part of the colony, and by estimate over the remainder, 500 nests containing eggs. The nests were not arranged closely together but were scattered rather loosely about the island at perhaps an average distance apart of twenty feet. In some areas the

Fig. 80. NEST AND EGGS OF GULL-BILLED TERN, SHOWING ORNAMENTATION WITH BITS OF SAND SLABS AND A SMALL TWIG; SALTON SEA, CALIFORNIA, MAY 21, 1927.

Fig. 81. NEST AND EGGS OF GULL-BILLED TERN, SHOWING SIMPLE DEPRESSION IN HARD SAND AND EFFECT OF WIND ON THE SAND NEAR THE NEST; SALTON SEA, MAY 21, 1927.

nests were as close as ten feet apart. Very few nests contained any ornamentation whatever, the exceptions having a slight rim of white, salt incrusted sand chips, or small bits of salt grass.

As to coloration, the eggs run truer to a certain type than do those from Texas in my collection. They are on the whole browner than Texas specimens. They also average a bit longer, the average of 27 eggs being 48.5x34 millimeters, while the average size of the same number of eggs in my collection from Texas is 47x34. Bent in his *Life Histories of Gulls and Terns* gives the average for all eggs which he measured, from both the Atlantic and Gulf coasts, as the same, 47x34.

It is interesting to speculate a little as to how this colony of Gull-billed Terns came to be established in Salton Sea. While the species has not been known to stray inland and away from the Atlantic, we here find it inland a distance of nearly a hundred miles from pelagic waters. The birds of course must have originally crossed from the Atlantic to the Pacific during their winter migration—most likely following

Fig. 82. NEST AND EGGS OF GULL-BILLED TERN ON AN ISLAND IN SALTON SEA, SHOWING CUTTING EFFECT ON THE SAND OF WIND EDDIES OFF THE BREAST OF THE SITTING BIRD.

the Panama Canal. They then followed the Pacific shore northward into the Gulf of Lower California. I imagine that when they came to the end of this body of salt water they were confused and instinctively pressed on farther northward until they realized they were lost and so settled on the Salton Sea, as being a perfectly good camping ground anyway. If these birds migrate southward in winter they may reunite with their Atlantic flocks and never return to Salton Sea.

However, the natives say that the Salton Sea colony has been active for several years; so it is doubtful, of course, that the birds now go south in winter as far as the Panama Canal. The birds are certainly well established here, know the country well, are able to withstand the tremendous heat of the Salton Sink, and have learned to eat fresh-water fish; for they do all their fishing at the mouth of the New River where it debouches into the Salton Sea.

The Salton Sea has existed since 1907. Neither Grinnell in 1908, nor Dawson (Birds Calif., IV, 1923, p. 1947) in January, 1913, noted the presence there of the

Gull-billed Tern; so we may assume that the colony is aged less than fourteen years. Howard and I believe it may be six years old. During this time it has escaped the ravages of egg collectors until this year.

Now, whether the birds really got lost and located in the Salton Sea in desperation, or whether they were lured there either by our climate or by real estate subdividers, I hope that the birds get a square deal from now on from the egg collectors, and that they will not be forced to move back to Texas where all the colonies are rigidly protected by both State and Federal authorities and collecting is not allowed under any circumstances. This band of a thousand Gull-billed Terns is the newest addition, in any quantity, to the Californian avifauna; they are unique birds and will well reward any one paying them a visit—but be sure and treat them as honored guests.

Beverly Hills, California, August 4, 1927.

THE CALIFORNIA CLAPPER RAIL
ITS NESTING HABITS, ENEMIES AND HABITAT

By DUDLEY SARGENT DE GROOT

(Contribution from the Department of Zoology, Stanford University)

THE AUTHOR since his arrival in the San Francisco Bay Region eleven years ago has been a continuous and interested observer of the California Clapper Rail *(Rallus obsoletus)*. Rather extensive field work during eight of those eleven years, singly and in coöperation with other ornithologists, has given him a fairly large store of information with which to form the background for the present paper.

To Harry Carriger, who was instrumental in giving me a proper introduction to many California birds, I owe thanks for my first rail trip in 1915. Since then we have made many trips together into rail country, each one of which has contributed material used in this study. To Professor John O. Snyder, of the new Stanford Museum of Natural History, friendly adviser of my college days, I owe thanks for encouragement in carrying out the field work on this project. But to my good friend Chase Littlejohn, that vigorous, enthusiastic, keen-eyed observer and naturalist, I owe endless thanks. Without Mr. Littlejohn's extensive field notes and minus his constant help and advice this paper would indeed have been a difficult task. Despite his seventy-three years of age he is today as active in the field as many collectors fifty years his junior, as is witnessed by the fact that during the spring of 1926 we took together no less than twenty field trips, covering in all over twenty-five hundred miles of territory!

In addition to the fact that there seems to be little unanimity of opinion among various ornithologists who from time to time have contributed articles upon the breeding habits of our California Clapper Rail, there are several important matters which I believe to have been either mis-stated or overlooked. I refer particularly to the number of eggs constituting a set; the usual or, one might say, invariable nesting site; the nesting material used; the average date upon which complete sets of eggs are most commonly found; early nesting records; late nesting records; the rearing of two broods per season by many pairs of rails; differences between first and second nests, with reasons therefor; reasons for the decrease in numbers of rail; and reasons for the continual decrease in rail habitat. Feeling that published records do not satisfactorily cover these matters, and in view of the fact that it is unquestionably only a matter of a very few years until this species will be nearly extinct in its native habitat, I offer these data for what they may be worth.

As a basis for the statements which follow I submit the field records of Mr. Chase Littlejohn, accumulated during the past fifty-five years, and my own personal records of the past eleven years. Mr. H. W. Carriger's records have also been used in some instances, these dating back over a period of twenty-five years.

NUMBER OF EGGS PER SET

Of a total of seventy-four nests with sets observed and recorded, the distribution in eggs per set is as follows: 3-5, 6-6, 20-7, 19-8, 19-9, 3-10, 2-11, 1-14, 1-21. The sets of five were, in each instance, complete, as were also the sets of six. The unusual set of fourteen is in the collection of Mr. Littlejohn. The uniformity of the eggs of this set leaves no question but that it was actually laid by one bird. One of the sets of eleven is in Mr. Littlejohn's collection, while the other is in the author's collection. These, too, are very uniform sets. The set of 21 was collected by Mr. Littlejohn in 1912. It

was unquestionably laid by two birds, for eleven of the eggs were distinctly different in size, shape and markings from the remaining ten. In addition, the "set" of eleven was ready to hatch, while the "set" of ten was practically fresh. This is the only record of double nesting of which I have knowledge.

On the basis of these figures there seems to be no question but what a set of seven is just as common and fully as complete as a set of nine, and yet invariably authors in the past have proclaimed "full sets" to contain "eight or nine eggs". A more correct statement would be, "seven, eight or nine eggs constitute the usual set."

NEST LOCATION

A survey of field notes, and of the data of sets collected, discloses the fact that in only three instances were nests placed more than fifteen feet from small or large "gutters". A "gutter", I might explain, is a small ditch, tributary or finger of a larger slough or creek. There are literally thousands of these gutters in any given piece of San Francisco Bay marshland, as anyone who has ever tried collecting there well knows. The whole life of the rail centers about these gutters; here it is they get most of their food, do most of their travelling, first teach their young to swim and hunt for food and, sad to say, here it is that many rail meet their doom.

Along the banks of these gutters grows what might well be termed the "rail bush", scientifically known as *Grindelia cuneifolia*. Reaching an average height of two and one half feet, these bright, green-leaved bushes are conspicuous as the tallest plants on the marsh, excluding tules. There is no simpler method of finding the Clapper Rail's nest than to locate a gutter whose banks are lined with these small bushes, and then proceed to switch each bush, in turn, with a small stick. If a person be in rail country and it is nesting season it will not be long until a rail will flush from her nest, giving even the most experienced oölogist a thrill.

The nest is generally placed at the base of a clump of grindelia bushes, where it is afforded considerable protection from discovery. The nest itself has been well described in several publications, and the only addition or correction which I might make is that in a majority of cases dried tule stalks or stems form the basis of the nest, rather than pickleweed, which is, however, invariably one of the constituents.

Of late years, and largely I think for protective reasons, especially protection from winged enemies, many Clapper Rail have adopted the heaviest and thickest clumps of pickleweed *(Salicornia ambigua)* they can find, for nesting sites. Thirty years ago seldom was a nest found in such a location; ten years ago it was the exception rather than the rule. During the past three years almost fifty percent of the nests found have been located in these dense clumps of pickleweed. There is no question but that this change is giving nesting birds greater protection from avian enemies as well as from prowling animals, including humans.

To find a nest in one of the new locations takes exceptionally keen eyesight and far greater knowledge of where to look than under the old conditions. The birds leave almost invariably by runways through the dense salicornia; they seldom flush as of old. And because they generally have two entrances, or rather an entrance and an exit, to their new domiciles they generally sneak off before you reach the nest proper. This means that a careful and continuously diligent search must be made to locate the well-hidden nest. Often the salicornia at the nesting site is two feet in depth, two feet of an extremely dense matting which often completely obscures the nest and eggs.

But although the rail have thus taken a beneficial step forward, toward self-preservation, they have overlooked one serious point, and that is that they still invariably nest within fifteen feet of the marsh gutters. In conclusion of this point, therefore, I should say that California Clapper Rail invariably nest along the banks of marsh gutters; that

in about fifty percent of the cases the nests are placed at the bases of the small grindelia bushes; that in about forty-five percent of the cases, and this figure is constantly on the increase, they nest beneath dense mats of pickleweed, and in the remaining five percent of cases in such unusual places as inside old barrels or old oil cans, under piles of drift, and under boards along the larger creeks.

NESTING MATERIALS

Of the many descriptions of nests and nesting material of the California Clapper Rail which I have read, few agree altogether with my records, which comprise observations on no less than three hundred and thirty-five nests. Nests, in the first place, must be divided into two classes: (1) those constructed early in the year for the first sitting; (2) those constructed late in the year, apparently for a second sitting.

The foundation or basis of the nest, in either case, is of broken bits of dried tule stems ranging from two to eight inches in length. Over this, for the early season nest, is placed a matting or layer of salicornia twigs which generally raises the structure from one to three or four inches above the usually damp marsh ground. The second, or late season nests are much more compactly and securely built and often measure four inches in depth and eighteen inches in diameter. These are generally constructed almost entirely of tules, either dried or living, and they are often attached to living tules, much in the manner of a coot's nest. They are often found floating about in the tule patches during the flood tides of late June and early July. It might be remarked here that these flood tides would float away any eggs laid in the early season nests.

EARLY AND LATE NESTING RECORDS

It has been the general tendency for authors upon the subject simply to remark that the breeding season extends from the "middle of April until the middle of May", or "fresh eggs may be found from the first of April until the first of May." As a matter of fact my records show complete sets to have been found as early as March 22, 1906 (Chase Littlejohn, Redwood City), and as late as July 13, 1926 (Chase Littlejohn and the author), and July 18, 1905 (Chase Littlejohn). On August 13, 1899, Mr. Littlejohn caught a young Clapper Rail which could not have been more than ten days old, indicating that eggs may be found as late as August 1.

Of the seventy-two nesting records previously referred to, twelve were recorded prior to April 10, fifteen after April 25, and forty-six between April 10 and 25. It is clearly evident from these records that the height of the breeding season is reached between April 10 and 25. Young birds have been noted by the author as early as April 15, while Mr. Littlejohn records the taking of a set of nine eggs on April 5, 1914, "almost ready to hatch."

By May 15 it is almost impossible to find a rail's nest containing eggs, although families of young birds are everywhere in evidence. On May 10, 1896, Mr. Littlejohn, by diligent search found a nest containing six eggs. On May 12, 1926, the author, in company with Will Unglish of Gilroy and D. Bernard Bull of San Jose, spent an entire day on the marsh near San Carlos, the net results of which were, as far as rail were concerned, 1-9 and 4-8, all evidently on the point of hatching. Many families of rail were seen, however, in all stages of growth, from those just hatched to others able to fly. In addition, Bull and Unglish found no less than twenty nests apiece, many with egg shells still evident, while the author located no less than fifty-two such nests. These facts, together with other similar data for other years, prove conclusively, I believe, that the first nesting of *Rallus obsoletus* is over by May 15.

To Mr. Littlejohn must go all of the credit for the statement which follows, namely, that our California Clapper Rail, or at least a good many pairs, raise two broods

per season. Under date of July 12, 1901, Mr. Littlejohn records the following: "Today I took a walk about the marsh near the Bay shore and was surprised to find the rail nesting again, but from previous observation I am convinced that they do this each year. After rearing the first brood, hatched in April or May, they nest again, building most of their nests this time in the new growth of tules and making a floating nest out of the old growth which has fallen down and become loosened from the roots. Although there must have been at least a foot of water under the nests at full tide, a few hours before, the eggs and upper material of the nest were perfectly dry. The birds were sitting and were flushed from the nests."

The fact that our records show no nests with eggs between May 15 and June 15, though search for them has been made on many occasions, together with the fact that we have many records of fresh sets after June 15 and from then on until July 18, seems proof positive that *Rallus obsoletus* in many instances does raise two broods per season. That all individuals do not raise second broods seems self-evident because second sets are not as easily found, nor as common, as first sets. Probably less than fifty percent of our California Clapper Rail raise second broods, but the fact that some second broods are raised is, I believe, beyond question.

In conclusion of this point I might summarize as follows: The earliest nesting date for *Rallus obsoletus* of which I have record, is March 22 (1906, Mr. Littlejohn); the latest, July 18 (1905, Mr. Littlejohn). There are two breeding periods the first of which reaches its height between April 10 and 25, during which all or a large majority of the birds breed; while the second reaches its height between June 25 and July 15. It seems probable, with the evidence now at hand, that approximately fifty percent of our rail raise second broods. Nests for the first brood are rather flimsy affairs and are generally placed on the dry ground beneath small bushes or in heavy clumps of pickleweed; nests for the second laying are well made structures of dried tule stems, generally placed in patches of living tules, where they are attached in such a manner that the high summer tides allow them to float, thus safe-guarding the eggs.

ENEMIES OF THE RAIL

Nowhere have I been able to find any comprehensive discussion of the causes for the depletion of our California Clapper Rail. In the old literature, particularly in the Nidiologist, early volumes of the Condor, and other bird magazines, are to be found many articles roundly criticizing the "game hog, the city dude with his pump gun, dog and boat, etc." There is no question but what we owe a good deal of the depletion of rail to these so-called "sportsmen." Thanks to local and federal legislation further depredations from this source have been practically abolished, until today there is no open season on rail, nor has there been for several years past.

As far back as 1894, R. H. Beck told Cooper Club members that "they [*Rallus obsoletus*] are rapidly becoming scarce" (Nidiologist, vol. I, 1894, p. 122). D. A. Cohen, speaking of the species in 1899, said, "it would be a wise move for the Supervisors of Alameda County to declare a closed season, or two successive closed seasons, on rail. This is the only means of preventing this fine bird, now almost absent from our mashes, from becoming annihilated" (Bull. Cooper Orn. Club, vol. I, 1899, p. 31). H. R. Taylor in 1894 mentions the fact that "the California Clapper Rail are becoming rapidly thinned in numbers. The pot-hunter and his dog and gun have done the work" (Nidiologist, vol. I, 1894, p. 153).

Many references may be found which call attention to the numbers of these birds which were formerly slaughtered by the market hunter. M. S. Ray is quoted as follows: "As late as 1889 I remember sportsmen returning with as many as 200 Clapper Rails" (Grinnell, Bryant, and Storer, Game Birds of California, 1918, p. 288). H.

C. Bryant said in 1915 that the California Clapper Rail were "so reduced in numbers four or five years ago, that the species would doubtless have become absolutely extinct within a few years" had it not been for the passage of the Federal Migratory Bird Law (California Fish and Game, vol. I, 1915, p. 192).

And yet in spite of legislative protection there is no close follower of the "rail situation", if it may be so termed, who is not decidedly alarmed about the future of this pathetically helpless species. Ornithologists were alarmed about the depletion in the numbers of rail twenty and thirty years ago due to lack of protection by law. Ten years ago they were still alarmed, although optimistic because of recently enacted Federal and State legislation. Since that time (1915) there have been many new and alarming developments. It is to these that I shall now turn my attention.

Whereas legislative protection, as Bryant has said, was the saving of our rail ten or fifteen years ago, today it appears to me that only legislative action of a far more drastic nature can possibly save the species from extinction. Let me explain that statement and give reasons for my belief.

Originally our rail were resident quite generally over the entire marshes of San Francisco Bay. With the coming of civilization, and more particularly with the coming of the modern pump-gun, thousands upon thousands of rail were shot annually by sportsmen and market hunters resident in the Bay district. About the cities, particularly about San Francisco, Oakland, and Alameda, they began gradually to disappear until, by 1915, Bay Farm Island was the only point in this territory where rail could still be found.

Since the enactment of the Federal Migratory Bird Law in 1913 I should enumerate rail enemies, in order of their importance, as follows: 1. Industry and the encroachments of civilization upon the few remaining haunts of our rail. 2. Individuals, particularly boys and young men, who persist in shooting rail in spite of our protective game laws. 3. The Norway rat, which infests almost all of the remaining marsh land, particularly those areas which have been dyked. 4. A small species of mussel which was introduced from the east into the Bay region at Redwood City some twenty years ago, and which has since spread to almost all of the gutters in the Palo Alto, Redwood, San Carlos and Belmont marsh areas. 5. A certain few "egg hogs" who year after year invade the marsh, taking every set of rail eggs they find. 6. Migratory Prairie Falcons, Ferruginous Rough-legs, Duck Hawks, and Cooper Hawks, and occasionally a resident Red-tailed Hawk or Golden Eagle. A brief discussion of each of the above points will, I believe, suffice in support of my statements.

I. INDUSTRY AND THE ENCROACHMENT OF CIVILIZATION

That civilization in general, and industry in particular, constitutes our rail's greatest enemy there can be little question. Twenty-five years ago the birds were fairly common in the northern half of the Bay region. Today reclamation of much of that land for agricultural purposes, and the ever increasing development of industrial plants of one sort or another, has completely wiped them out of existence in that territory. Not even a single specimen has been recorded from there in recent years! In 1915 in a two-hour field trip on Bay Farm Island, Alameda, I had little difficulty in locating a dozen rail nests. Today Bay Farm Island throbs with human life and industry, and the unfortunate rail has been forced to retreat on one more front.

At Hayward, where Cohen once found them abundant, and even on down to Newark, where ten years ago they were quite common, today hardly a rail can be found. Salt works by the score, magnesia plants, the Dumbarton railroad and automobile bridges, and other industrial enterprises of a similar nature have completely wiped out their breeding and feeding grounds.

At Alviso several industrial plants are endangering haunts which have always been famous for the abundance of Clapper Rail. Here, in addition, many private and a few commercial duck clubs, where I am sorry to say all of the members are not above "potting" a rail now and then for a "mulligan", constitute an additional hazard which is further depleting the ranks of this rapidly vanishing species.

From Alviso on around the lower end of the Bay, and on the Peninsula side up to Palo Alto, only two serious rail hazards present themselves. The first is the reclamation of marsh land for agricultural purposes, and the second is the establishment of several duck preserves. Here again, breeding and feeding grounds are being depleted, and it is to be feared that during the duck season a very considerable number of rail meet their fate in some "unexplainable manner"!

At Palo Alto the Dumbarton railroad and vehicle bridges have destroyed the security of one of the rail's strongest stamping grounds. Several duck clubs have also helped to break up heretofore inviolate breeding grounds in this district. Between Palo Alto and Redwood City one large real estate venture threatens to break into another heretofore prosperous rail territory. At Redwood City proper the Pacific Portland Cement Company's plant has destroyed one huge area formerly occupied by rail, and it threatens to break into another. Across Redwood Creek from the cement plant, to the north, there remains one large tract of land which has always been "safe ground" for rail because it has been isolated from the mainland on all sides; it is virtually an island. This tract, which comprises some 4000 to 6000 acres, has during the past few years been an increasingly important breeding ground because of its singular isolation. It is inaccessible to humans except by boat, it has not been dyked, no duck clubs have invaded any part of it, and so far no industrial plants have been established within its confines.

To the north of the large creek (Smith's) which flows out towards the bay from San Carlos lies a large reclaimed area which is now being used for agricultural purposes. From Belmont north to Beresford the bay shore has been dyked and is being used for salt ponds and a duck preserve. At Beresford the aviation field takes up a considerable area, just north of which there are more salt ponds. The Leslie Salt Works cover the bay shore area immediately adjoining South San Mateo and Leslie, while at North San Mateo various human enterprises have destroyed once famous rail country. Among these may be named an amusement park, city dump, residential property, etc.

From Burlingame north to Broadway civilization is too evident for the security of rail, and I have not seen or heard of a bird thereabouts for several years. Between Broadway and South San Francisco is another piece of once famous rail ground now totally, or nearly, devoid of this bird. Much of this land has been reclaimed and now supports large dairy herds, while a portion of it is only now being broken up by the new Bay Shore Highway. Way up into Baden, where rail nested commonly fifteen years ago, civilization has almost completely wiped out any evidence that the bay once covered that area. Beyond South San Francisco and on up to San Francisco every vestige of marshland is rapidly being eradicated by factories, shops, railroad yards, etc., until today it would be a novelty indeed to see one of our picturesque little rail anywhere in the district.

Such is the status of the rail ground about San Francisco Bay today, the only ground in the world where California Clapper Rail have ever been abundant. For fifty years the web of civilization has been ever tightening, ever forcing the species into a smaller and more narrowly confined area until it is now, without doubt, only a matter of a few more years until *Rallus obsoletus* will be wiped out of existence in its native haunts.

I do not know of a single species of bird which has taken such a strong hold upon me as has this pathetic marsh dweller. Anyone who knows the Clapper Rail, his harmless habits, his clownish and helpless flight, his friendliness and apparent curiosity as he stands out in the middle of a mud flat or upon some piece of floating debris, the most conspicuous object in sight, cannot help but love him.

To summarize: During the early days of the settlement and civilization of the Bay region the rail's worst enemy was the man with the gun and dog. Man-made protection, in the form of game laws, finally came to his aid and since 1913 protection from hunters has been fairly complete. Since civilization began in the Bay region a far more sinister and relentless foe has been at work gradually annihilating the rail by taking away, bit by bit, his feeding and breeding grounds. Never yet have sportsmen or nature lovers found a way of stopping the onrush of this most ominous foe of wild life, human industry. With all Americans business is business and seldom if ever does sentiment stand in the way of business progress.

The San Francisco Bay region is destined within the next few decades, without doubt, to become one of the great industrial centers of the Pacific Coast, if not of the world. This means that the great marsh areas are to be completely wiped out of existence, as such, within the next few years. The result is obvious, for industry means all of the thousand and one human "improvements" which will contaminate or eliminate the rail's natural habitat, his breeding and feeding grounds.

II. INFLUENCE OF DUCK PRESERVES AND SCARCITY OF DUCKS

About the Bay region, particularly about the marshes adjacent to Alviso, Mountain View, Palo Alto, Redwood City and San Carlos, are to be found many private duck clubs or preserves. About these clubs during the duck season a good many hunters congregate for semi- or tri-weekly shoots. When duck shooting is poor, as it has been invariably for the past few years, many of these hunters do not hesitate to "practice" on other targets. A few hunters go out and bag protected game birds without discrimination, these commonly including curlew, plover, snipe of various species, and rail. Other hunters either through ignorance, inexperience, or whatever you wish to call it, shoot the first thing that comes along that looks even remotely like a duck; very often rail fall in this class. Other hunters about these preserves often shoot Black-crowned Night Herons, Great Blue Herons, Red-tailed, Sparrow and Marsh Hawks, and even occasionally a White-tailed Kite, on the grounds that such birds are "destructive", or "no good", or "just naturally nuisances"!

Second only to these adult law breakers who are contributing to the destruction of many beneficial birds, including the California Clapper Rail, comes "the boy with a gun and a lust to kill something, anything". About the smaller peninsula towns there are many of these boys, ranging from twelve to twenty-one years of age, who spend most of their spare time during the duck season on the marsh, and woe to the luckless rail that dares show himself. Boys are boys, and rarely do you find one nowadays, when wild life is so scarce, who can resist the temptation to shoot the first bird that jumps. Many rail, just how many it is hard to say, are killed at the hands of these youngsters.

For the benefit of all of our protected birds, but more particularly for the benefit of the Clapper Rail, the White-tailed Kite, the Sparrow Hawk and the Marsh Hawk, it seems to me that the Fish and Game Commission of the State, the Audubon Society, the Cooper Club, and other interested organizations can and should immediately enter into an extensive educational campaign. The printing in colors of life-sized pictures of such birds, giving a detailed description of them and their value to society, such pictures to be placed in all duck preserve club-houses, sporting goods stores, public schools,

etc.; would be a preliminary step which, I am sure, would bring results of far-reaching importance.

In addition the Fish and Game Commission might well extend their excellent "Dollar a Year Game Warden" plan so that every section of the state, no matter how small, would be looked after. Certainly, about the Bay region there is a crying need for more wardens who will give special attention to the protection of our rail. By educating the ignorant and disciplining the law-breakers there can be little question but that the Clapper Rail, along with other protected species, would benefit materially.

III. THE NORWAY RAT

For various reasons, for example the establishment of salt ponds, the placing of power lines, and the reclamation of land for agriculture and for industrial projects, many areas about the San Francisco Bay shore have been dyked. No sooner is a dyke constructed than Norway rats appear in great numbers. Large gray fellows they are, on a dark night appearing to be as large as small cotton-tail rabbits. Their home is on the dykes, generally in an old shack, a pile of drift material, or some similar rendezvous. The Clapper Rail has no more deadly enemy than this sinister fellow. No rail dares nest on a marsh area which has been dyked, for as surely as she does this vicious enemy will track her down and destroy the eggs. Many nests have I found bearing mute evidence of the fact that some luckless rail had gambled her skill at nest-hiding against the cunning of the Norway rat, only to have her home destroyed.

Ridding the marsh of these rats seems a hopeless job, to say nothing of being an expensive one. The rail's only alternative is to move to new undyked areas. But with more dykes being erected constantly, the available undyked land becomes smaller and smaller in area. Once again the relentless surge of civilization plays a leading part in annihilating our Clapper Rail.

IV. THE INVISIBLE FOE

Some thirty years ago a small black mussel was introduced from the east into the marsh near Redwood City. It spread like a weed and it was only a few years until every creek and gutter on the west side of the Bay was inhabited. This apparently harmless little mussel has been another of the rail's most relentless enemies, and the number of rail deaths attributable to its activities is incredible.

A peculiar and characteristic thing about this mussel is that when it dies the two halves of its shell are so tightly locked together that they cannot be pried apart without injuring or breaking the shell. And therein lies the story of the death of many a rail. Countless millions of these small mussels cover the edges and sometimes the entire bottoms of the gutters and creeks of the west Bay marshes. Up under the banks, where the rail so commonly feed and hide when the tide is out, these death traps are found in greatest numbers. With the incoming and outgoing tides, at just the time when the rail are feeding, these mussels open their shells in search of food. Along comes a rail gingerly pecking into the soft mud in search of crabs, worms, or other small marsh life. Inadvertently he rams his beak into the open mussel and in an instant the trap is sprung and the rail is helplessly and hopelessly trapped. If it happens to be an adult bird the mussel is generally pulled loose from its surroundings by the frantic efforts of the bird to release himself from his unexpected assailant. But, alas! shaking and scraping and pulling are all in vain; for no self-respecting mussel, once closed on an enemy, will ever release his death grip. Unable to prod for food, often unable even to open his beak, and frightened into madness by the relentlessness of his foe the poor rail eventually comes to a pitiful end, death by starvation. Mr. Littlejohn had for years a mounted adult rail which he collected on the marsh in the last stages of such a

struggle. Several other specimens have been reported in the same condition and no one knows or can even estimate the number which go to their death in this manner.

A second and perhaps a more common method by which these mussels destroy rail is by trapping their toes. While in search of food it is almost impossible for the birds to avoid stepping onto or into these partially or often fully hidden traps. The instant they do so the trap closes and then the battle for life begins. In the case of an adult rail the mussels are generally pulled loose and often dragged around the marsh for days, or even weeks. Eventually the rail may die, or, as is more generally the case, that part of the toe which is encased in the mussel's shell breaks or tears loose from the rest of the foot.

Many dead and live rail have been examined by Mr. Littlejohn in the past twenty years, and a good number by the author, and in almost every instance one or more toes have been found missing. It is our belief that at least seventy-five percent, and perhaps more, of the adult rail of the Redwood marsh area are minus toes from this cause. While the adult birds are generally able to pull the mussels loose from their attachments there are, no doubt, some cases where the bivalves prove too strong for the rail. In such cases it is simply a matter of hours until the next incoming tide drowns the hapless individual so caught. But while the adult rail generally escapes with merely the loss of a toe or two, young birds must meet death frequently by both methods, particularly by the latter.

Upon hatching a brood of young the parents at once lead them to some small gutter where they teach them to look for food. It is these small gutters, particularly, which are filled with mussels, so filled in fact that it is practically impossible to find space along their sides which is not literally covered. The hazard to young rail therefore is obvious; it is greater, I should say, than any other single hazard which these silky little black balls of down have to face in their early days of life.

Here again it is difficult, in fact it is merely guesswork, to estimate the number of young which are killed annually by these deadly enemies. Two facts give me some basis for stating that probably one or two chicks in every brood, if not more, meet an untimely end in this manner. First, whereas generally every egg of the usual rail set of seven, eight or nine, is fertile and hatches, seldom do you observe half or three-quarter grown broods of young rail containing more than five or six individuals. I attribute this loss or decrease to the work of the mussels. Second, this year Mr. Littlejohn and I were fortunate enough actually to obtain proof of this contention when, on July 13 at Redwood City, Mr. Littlejohn heard an adult bird clucking to a brood of young in a small gutter. He called me to the spot and after diligent searching we discovered the cause of the parent bird's extreme solicitude. One of her young, probably four days old, was held tightly in the grip of a mussel which had closed on its center toe. The tide was coming in rapidly and in a very few minutes, had we not discovered him, the poor little tyke would have been drowned. He was exhausted from his frantic efforts to free himself from his merciless captor and his frail little toe was just hanging by a thread, enough of a thead, however, to hold him fast. We tried to pry the shell open but without avail. As a last resort we cut the tiny ligament which held the little fellow captive, and put him back on the ground where he lost no time disappearing in the direction in which his mother had last been seen.

V. EGG-COLLECTORS

Lattin and Short's egg price list of 1905 listed California Clapper Rail eggs at fifty cents each. The American Oologists Exchange Price List of 1922 lists the same egg at one dollar. At either period it is clearly evident that California Clapper Rail eggs were not classed as rarities; nor are they today. Yet when the extremely limited range of the species is taken into consideration, is this not rather an interesting situation?

Throughout all of the literature which I have scanned, and as a result of personal correspondence and personal field work, I find but two localities in the world where *Rallus obsoletus* have been known to breed. Marsh land about San Francisco Bay, as already described, is the normal and by far the most common breeding ground, while the Elkhorn Slough district south of Watsonville, California, is the second recorded breeding area. Additional records of stray birds observed along the ocean marshes of Marin County may be found, with perhaps a casual bird being noted as far north as Grays Harbor, Washington.

But there remain, as indicated, but two places in the world where these birds have ever been found actually breeding. Ninety-nine and ninety-nine one-hundredths percent of the sets of California Clapper Rail eggs in collections today have been taken on San Francisco Bay, or in its environs. Furthermore, it would be safe to say that a majority of these sets have been collected by fewer than twenty-five well-known collectors, perhaps a dozen of whom have made it their business to supply the market.

In order to do this it is obvious that many of these collectors have made it their business to go out onto the marsh and take every rail set they could find. Locating a nest is an easy task, as previously pointed out, and ten years ago twenty-five to thirty nests in a day's hunt was considered to be just an ordinary occurrence. I have it upon the authority of Mr. Littlejohn that certain egg collectors loaded up in this manner, not once, but several times during a season. Although those days and those particular collectors are now gone, even today there are a few collectors who make it their business to go to the marsh, once or twice every season, taking every set of rail's eggs they find, totally regardless of the increasing scarcity of the birds.

In view of the above facts, all of which point to the early extinction of the species unless some drastic protective measures are taken, would it not be wise for the California Fish and Game Commission to place the California Clapper Rail upon its list of fully protected birds? Certainly sets of rail eggs and prepared skins are common enough and of small enough value so that all active egg and bird collectors would respect any such protective legislation.

VI. RAIL AS FOOD FOR RAPTORES

Without question Chase Littlejohn has made a more careful and thorough study of the relationship between the California Clapper Rail and the resident and migratory raptores of the south Bay region than any other ornithologist in history, and his field notes offer a rich storehouse of material upon which to draw. Turning first to the migratory raptores we find the names of Ferruginous Rough-leg, Duck Hawk and Prairie Falcon conspicuous as rail enemies. In former years, particularly during the fall and winter months, these birds all contributed toward the destruction of the rail. Of late years, although seen occasionally on the marsh, we believe this source of danger to be almost negligible. This is due, in large part no doubt, to the woeful decrease in the number of ducks which annually winter in the Bay marshes, and which these raptores follow.

In former years, when rail were plentiful, it was not at all uncommon to see one of the above mentioned hawks swoop down into a small gutter, soon to reappear with an unfortunate rail clutched in its talons. But it was at high tide, particularly, that the rail were at the mercy of these enemies. With their native hiding places, the gutters, filled with water, many of them foolishly strutted forth to points of vantage on the high ground, seemingly totally oblivious to all danger. Here, perched upon an old log or piece of drift they fell easy prey to the alert eye, bullet-like dive, and slashing talons of marauding Duck Hawks. Oftentimes, aware of the enemy, a luckless rail would des-

perately take to wing in an attempt to gain some thick clump of salicornia in which to hide; but rarely if ever with his slow, pathetically helpless flight was he able to evade the bullet-like speed and accuracy of his enemy's charge.

The Cooper Hawk has always been, and still is, a frequent visitor of the marsh land about San Francisco Bay. I have never seen this species actually catch or kill a rail, although many times I have seen a rail make the same desperate effort to hide from this species as it would from the hawks mentioned above. The evidence would point, therefore, to the fact that this species too may occasionally kill rail.

Turning next to resident species: in early days when squirrels, rabbits and other small mammals were abundant in the foothills, it is safe to say that rail were almost never molested by resident raptores. But with the ever-increasing tide of civilization, there has been a steady decrease in their native food supply. Squirrels have been poisoned and shot by farmers, farm bureaus and many other agencies, until today it takes a careful search to find any sizeable colony of them near the Bay. Rabbits, including cotton-tails, brush rabbits and even jack rabbits, are almost a novelty nowadays in San Mateo and Santa Clara counties, thanks to the annual bombardment by hunters of the Bay region. Other less common, but none the less important species of small mammals are correspondingly depleted in numbers until today our few remaining Red-tail Hawks, Golden Eagles and Horned Owls have a hard time indeed, getting a square meal. With their native food supply so sadly depleted these resident birds have been forced to look elsewhere for food. What more natural source could they have found than the rail of the marsh?

For the past ten years it has been no uncommon sight to see as many as half a dozen eagles and red-tails circling above a certain piece of marsh land at one time. We have never caught an eagle actually in possession of a rail, but we have, times without number, seen red-tails in possession of rail. Mr. Littlejohn during the past fifteen years has personally killed over twenty Red-tail Hawks, each one of which had some portion of a freshly killed rail in its talons. A majority of these birds were shot while feeding on their kill, perched in a giant walnut tree which stands at the edge of the marsh in Mr. Littlejohn's back yard. During the last five years, however, red-tails have become so scarce in San Mateo and Santa Clara counties that this source of danger to the rail is practically eliminated.

Our big Horned Owl we have occasionally seen on the marsh on moonlight nights, silently gliding about the rail habitat in a rather suspicious manner. And although we have never found rail feathers about the owl's nest, nor have we ever actually caught an owl with a rail in his possession, indications point to an occasional rail death from this source. Certainly the rail set up a terrific racket when, on a moonlight night, one of these huge sinister shadows glides low over their territory.

For a period of years, beginning, so far as we know, about 1900 and lasting until about 1912, and perhaps even today in some other marsh locality, a pair of Duck Hawks nested on the bay shore of the marsh, near Redwood City. Mr. Littlejohn first discovered this pair nesting in an old barrel, above high tide, on a shell bank. For several years he annually collected a beautiful set of eggs from this pair of birds. Their food, and the food for their young, undoubtedly consisted largely of rail which at the rate of a bare minimum of two a day would amount to the appalling total of some seven hundred per year. Fortunately for the rail of the vicinity I believe that this pair of Duck Hawks was killed by hunters several years ago, as the birds have not been noted in their old haunts for some time past.

POSSIBILITY OF DOMESTICATION OR OF INTRODUCTION INTO NEW LOCALITIES

An interesting and unusual occurrence was brought to my attention in the early part of May, 1926, at Menlo Park, California. Out in the chicken yard of a certain

family was a bantam hen proudly strutting about the enclosure, the unique "mother" of seven little fuzzy black rail. Upon questioning the owner I learned that the eggs had been found in their nest on the marsh, brought into town, immediately placed under this bantam hen and in due course of time had hatched out just as perfectly as though they had never been disturbed. The young rail were as healthy and seemingly as contented as any youngsters I had ever observed on the marsh, picking and pecking here and there just as placidly as any young chicks in the yard. Their adopted mother took exceptionally good care of them, fighting for their rights just as fervently as though they were her own.

For two weeks they got along splendidly, and then one day, suddenly and apparently without cause, several bantam roosters turned on them and, despite the gallant defense of the mother hen, killed them all. Human help arrived too late to save any of the helpless little waifs and thus unfortunately ended one of the most unusual wild game raising efforts, I believe, ever attempted.

This experiment proves rather conclusively that under proper auspices, at very little expense or trouble and with practically no equipment, these rail might very easily be "hand-raised" and domesticated. If this could be done, and places made for them at the State Game Farm and in various public parks, duck preserves, etc., a happy and inexpensive solution of the rail problem would be found. Introduction into other parts of the state might feasibly be carried out and if the rail seemed to thrive in these new locations perhaps their extinction might be averted. I, for one, would be glad to donate my services to the Game Commission in the furtherance of any such project.

ADDENDUM

Since completing this paper some new material has come to my attention which warrants an additional word or two concerning the rail habitat. In my discussion of present nesting grounds I stated that a certain large tract of land north of Redwood City and south of Belmont, a large part of which actually lies between Redwood and Smith creeks, was without doubt the most prolific rail breeding ground on the Bay yet untouched by civilization. I spoke too soon, however, for only recently I have received no less than three separate advertising circulars telling of one of the latest and greatest developments ever planned for the Bay region, namely the establishment of Port San Francisco on the very tract of land which I mentioned above.

This immense project is being pushed by the San Francisco Bay Terminals Company, a corporation of San Francisco business men. As their pamphlets state: "The property embraced within the project is 4156.5 acres located on the San Francisco Bay Shore", between Belmont and San Carlos. Ground for unit number one, which is located just south and east of Belmont, was broken on October 10, 1926, so that in all probability many rail in the spring of 1927 will be forced to vacate nesting sites which have been used by them for generations upon generations. The ultimate establishment of units 2 and 3 to the south of number 1 will, in all probability, eat into the very heart of that great Redwood-San Carlos breeding ground which, as I stated, has heretofore been rail ground inviolate.

With the ultimate establishment of Port San Francisco, with its factories, docks, warehouses, railroad trunk lines, highways, etc., will come the end of the California Clapper Rail in a part of their native habitat which today stands forth as their most conspicuous and important breeding and feeding ground. With the ruination of this tract, except for small isolated, rat infested areas here and there, particularly in the neighborhood of Alviso, so far as I can see we will have to write "finis" to the history of the California Clapper Rail. I can only hope that ways and means of saving it from actual extinction, by introduction into suitable districts elsewhere, will be carried out.

Santa Barbara State College, Santa Barbara, California, April 8, 1927.

FROM FIELD AND STUDY

A Commensal Relation of the California Quail with the California Ground Squirrel.—While walking along the lower trail on the south side of Strawberry Canyon in the Berkeley Hills, on August 25, 1927, at 5 P. M., my attention was attracted to a commotion, some twenty yards away on the opposite side of the creek, in a fringe of tar weed *(Madia sativa)* that grew along the edge of a perpendicular bank two feet in height. I soon saw that the commotion was caused by a California Ground Squirrel *(Otospermophilus grammurus beecheyi)* pulling down the stalks of the tar weed in order to eat the seeds of that plant. Indeed, the squirrel actually climbed into the tops of some of the larger plants that were so intertwined as to form a support sufficiently strong to bear his weight. In climbing and reaching for the heads of the tar weeds that overhung the bank, a goodly number of seeds were shattered to the ground at the base of the bank. There, three California Quail *(Lophortyx californica californica)* made the most of the opportunity by eating the seeds as fast as they fell on the ground.

To me, the seeds had a not unpleasant, oily, resinous taste. During the seven minutes that I remained on watch, the animals proceeded a distance of between twelve and fifteen feet. The quail at the foot of the bank closely followed along below the squirrel. Once, the squirrel abruptly moved a distance of four feet between feeding positions. The quail followed; but whether or not the birds recognized the cause and effect involved, I do not know. Perhaps they did not even follow the squirrel but were attracted to the spot four feet distant only by the edible seeds that they perceived there. However this may have been, the phenomenon constitutes an interesting commensal relation not, in so far as I am aware, previously noted between these two species.—E. RAYMOND HALL, *Museum of Vertebrate Zoology, University of California, Berkeley, September 8, 1927.*

Western Wood Pewees and Dwarf Cowbirds Nesting in San Diego.—For several seasons past Western Wood Pewees *(Myiochanes richardsonii)* have nested in the grounds of the San Diego Zoological Gardens. In the summer of 1923, a pair of this species was observed feeding a young Dwarf Cowbird *(Molothrus ater obscurus)* just out of the nest. The young impostor would sit on a fence or low branch of a tree and beg continuously; and when one of its foster parents brought it food, it would take the proffered tidbit and fly to the ground with it before eating. This procedure annoyed the Wood Pewees greatly and they would dart down at their unnatural young one, scolding vigorously, and attempt to drive it back to its former perch. They continued to feed their wayward child, however, until the latter was fully developed and well able to care for itself.

In 1924, another Cowbird was raised by the Wood Pewees, and again the difference in feeding habits caused much friction between the young bird and its foster parents. In 1925, no observations were made, and in 1926, three young Wood Pewees were raised and successfully launched into the world. This year, 1927, a Western Wood Pewee was discovered starting its nest on a high branch of a eucalyptus tree standing in a canyon in the Zoo grounds and just back of the O'Rourke Zoological Institute, so that the nest is on the level of the first floor windows of that building. When the nest was first seen, on May 11, it was just started; and now, on the 19th, the bird is presumably laying its eggs but has not yet started steady brooding. At every trip with material the pewee would enter the nest and mold it with much turning and twisting of the body. I have never seen two pewees in the immediate vicinity of the nest, which is saddled on a bare limb and easily seen.—FRANK F. GANDER, *East San Diego, California, May 21, 1927.*

Black Bear Tries to Gnaw into a Woodpecker's Nest.—On June 26, 1927, at 6800 feet altitude, between Mono Meadows and Illilouette Creek in the Yosemite region, the writer found a nest of the Arctic Three-toed Woodpecker *(Picoides arcticus)*. This nest was located only four feet above the ground in a large live lodgepole pine. My attention was first attracted to the locality by the unusually vigorous scolding of the parent woodpeckers. A closer approach revealed the cause of the excitement.

A bear had located the nest, probably through the noise of the young woodpeckers, which were old enough to come to the nest entrance to receive food, and which squealed with anticipation of a meal every time any bird, animal or person came close to the nest tree. In an endeavor to get at the young in the nest, the bear had bitten out slabs of green wood twelve inches long, two inches wide, and one-quarter of an inch thick. The muddy stains around the inside of the nest entrance showed that the bear had thrust his nose into the hole repeatedly. But after gnawing over an area 10 x 10 inches on the tree trunk to a depth of more than an inch, the bear gave it up as a bad job. Had the nest been in an old stump, the outcome would probably have been different. This offers a reasonable explanation of the tendency of certain woodpeckers to nest in living trees.—JOSEPH DIXON, *Berkeley, California, July 27, 1927.*

Another Man-o-war-bird Wanders into Californian Waters.—The short list of records of the Man-o-war-bird *(Fregata aquila)* north of the Mexican border may warrant a note on the capture of one of these birds off San Diego, California, on June 27, 1927. The bird was shot by E. F. Gottesburen from the deck of a deep-sea fishing barge anchored off the edge of the kelp beds about a mile and a half southwest of Point Loma. Mr. Gottesburen states that the bird circled about the barge and exhibited no fear, even when his first shot failed to take effect. It was a young male in the white-headed plumage. The specimen was presented to the San Diego Society of Natural History and is now on exhibition, mounted, in its museum in Balboa Park.—CLINTON G. ABBOTT, *San Diego Society of Natural History, Balboa Park, San Diego, California, August 23, 1927.*

Analysis of Sexes in a Junco Migration.—The writers began to band Shufeldt juncos here (latitude 53° N, altitude 3000 feet), on the 7th of April of this year, or roughly four weeks before the cessation of snows which remained on the ground an appreciable time. The work was done under exceptionally favorable conditions from the bander's point of view. The season was phenomenally late and snowy, and great numbers of birds were forced to depend wholly upon us for food. Also a large equipment of trapping material was concentrated on a few acres which, owing to slope and exposure, represented the only bare ground for miles in all directions. The surroundings were, in fact, mostly heavy evergreen timber, holding its deep snow into May. Furthermore the site was on a principal (unfrozen) waterway and opposite the terminations of various important mountain passes.

The writers believe that for the first month at least hardly a junco passed unbanded, and that the records show a very complete picture of the migration, with the exception of a few very early individuals. April 7th to 9th inclusive produced only from two to five birds each. The great rush began on the 10th. The following table shows the distribution of sexes and "doubtfuls" among the 688 birds caught up to June 15. Great care has been taken to exclude all cases where any doubt was possible as to sex or subspecies.

Week	April 7-13	14-20	21-27	28-May 4	5-11
Males	100	121	82	130	26
Females	17	26	17	38	28
Doubtful	12	20	11	14	6

Week	May 12-18	19-25	26-June 1	2-8	9-15	Total
Males	15	2	2	0	0	478
Females	7	1	6	1	3	144
Doubtful	1	1	1	0	0	66

The banding fell to zero when the birds separated to breed. We found our first nest, containing four eggs, on June 15. Yet at this date, as recorded by the traps, only 144 females had arrived, as against 478 males. During the breeding season the numbers in the locality must be closely equivalent, as wandering, non-breeding birds would almost certainly be detected by feeding and trapping. No more striking illustration of the territorial theory can be imagined than the behavior of the breeding birds, which, though nesting about us with the regularity of a checker-board, cease

to be known at the traps, perhaps scarcely a hundred yards away, where they have been living for the previous weeks. The fact that none include the traps within their territory must be attributed to the special shyness of the breeding season.

What, then, is the explanation of the discrepancy in numbers? To us it seems probable that the resident males, eager to breed, and perhaps, as the territorialists suggest, with sites already preëmpted, attach themselves to mates the moment the latter arrive, and the breeding segregation is at once begun. This, however, fails to explain the inequality in numbers among the large proportion of birds which must have passed us for points beyond.

The traps in question were closed for a period which included parts of the eighth and ninth weeks, but others in the same valley were under observation, as well as reports of those of a neighbor in an adjacent valley. It is highly improbable that this interruption affected the results materially, if at all. Sustained repetition ceased by the sixth week, with the exception of half a dozen sluggard males which had lived at the traps since the beginning.—THOMAS T. MCCABE and ELINOR BOLLES MCCABE, *Indianpoint Lake, Barkerville, British Columbia, September 12, 1927.*

Road-runner versus Mockingbird.—An incident which occurred at Azusa, California, on August 16 proved that mockingbirds have good grounds for their very evident hostility towards road-runners. Attracted by frantic cries and the scolding of mockingbirds in the yard, we found that a road-runner *(Geococcyx californianus)* had captured an immature but full-grown mockingbird, which it would no doubt have killed had it not been frightened away by our approach. When picked up, the mockingbird was lying helplessly on its back, but appeared not to be seriously hurt, and when presently released was able to fly away.—ROBERT S. WOODS, *Azusa, California, August 22, 1297.*

A Further Chronicle of the Passenger Pigeon and of Methods Employed in Hunting It.—The following extract from a letter written by Mr. John Thomas Waterhouse to his parents, the Reverend and Mrs. John Waterhouse, in London, from Camp Gaugh, Franklin Township, Burgen County, New Jersey, dated, March 23, 1838, may be of interest as adding to our knowledge of the Passenger Pigeon *(Ectopistes migratorius)*: The account is quoted verbatim.

"For the last fortnight the air has been almost black with wild pigeons emigrating from the Carolina swamps to more northerly latitudes making their summer quarters in the lake countries. Within ten miles square during the last fortnight I suppose they have shot or netted at least twenty thousand. They fix up a kind of hut in a field made of limbs of trees and buckwheat stubble. They have one or two fliers which they throw out every time a flock passes; the fliers are of the wild pigeon breed usually wintered over or sometimes they take them direct from the flocks, tie their legs to a small piece of twine and throw them up. There is a floor cleared on the ground and buckwheat spread for a bait and [they] have a pigeon on the floor and also a stool pigeon which they move at pleasure by a rope fixed to it in the hut. There is then a net so fixed having a rope that fastens it to a stake in the ground at one end, and soon as ever the pigeons fly down the man in the hut pulls another rope fastened to the net and jerks it over them. They will sometimes net in this way at one haul three or four hundred. Whilst I am writing they are in the adjoining room picking seven pigeons for our breakfast. They were shot this morning at one fire of the gun."—ANNIE M. ALEXANDER, *Honolulu, T. H., August 19, 1927.*

The Amount of Food Consumed by Cormorants.—The interesting article by Mr. A. H. E. Mattingly on Cormorants in Relation to Fisheries in a recent number of the CONDOR (XXIX, 1927, pp. 182-187) with its statements as to the consumption of food by these birds, prompts me to add a note on the food of the Florida Cormorant *(Phalacrocorax auritus floridanus)*. The National Zoological Park, under the Smithsonian Institution, has had numbers of these birds on exhibition. In winter the cormorants have been confined in the bird house, while in summer they have had the freedom of a large flight cage 158 feet long, 50 feet wide, and from 53 to 56 feet high. The birds breed regularly in the summer enclosure.

Under these conditions each individual cormorant receives from three-fourths of a pound to a pound of fish per day, given at one feeding, and for six days in the week. On Sunday the birds receive no food. On this allowance they thrive and live in perfect health for years.

As birds at freedom are more active, they may require somewhat more food though I am inclined to doubt that they eat on the average much more than the amount indicated for our captives. The Florida Cormorant is possibly slightly less in bulk than *Phalacrocorax ater* and *P. fuscescens* discussed by Mr. Mattingly so that his statement that these may eat one and one-half pounds of fish per day seems sufficiently large.—A. WETMORE, *U. S. National Museum, Washington, D. C., July 28, 1927.*

The Rufous-necked Sandpiper in Alaska.—In my note upon the occurrence of *Pisobia ruficollis* at St. Paul, Pribilof Islands (CONDOR, XXIX, 1927, p. 200), an injustice is done Mr. Alfred M. Bailey in omitting to state that he had already placed the species upon a firm basis as a North American bird, an injustice for which I wish to make such amends as I can. Bailey's records of occurrence at points on the Alaska mainland, as reported first in the CONDOR for 1924 (XXVI, p. 195), and elaborated in a later issue of the same magazine (XXVIII, 1926, p. 32), are as final proof as could be asked for, and I had no intention of questioning them, even by inference. My main interest in the Pribilof Island occurrence lay in correcting the previous erroneous identification of the specimen concerned, and Bailey's account of the species had for the moment slipped from my memory.—H. S. SWARTH, *California Academy of Sciences, San Francisco, California, August 19, 1927.*

The Barn Owl in its Relation to the Rodent Population at Berkeley, California—During June of 1926, the writer, in walking to his home on Haste Street from the Museum of Vertebrate Zoology, between the hours of 10 and 12 P. M., almost nightly heard Barn Owls in the tower of the First Presbyterian Church, located at Dana Street and Channing Way. With the idea of comparing the food of these owls, that roosted well within the thickly built residential district of Berkeley, with that of certain other Barn Owls that were under observation (see Foster, CONDOR, XXVIII, 1926, p. 130, and XXIX, 1927, p. 246), and that roosted far from any human habitation, Professor G. L. Foster and the writer gained entrance to the church tower early in July, 1926, and found there, beneath the perches of two adult and five nearly grown young Barn Owls *(Tyto alba pratincola)*, a large accumulation of regurgitated pellets. A number of the more complete pellets were selected from this accumulation and later examined, with the following results as to food items identified:

Kind of Animal	Number of Individuals
California Shrew *(Sorex californicus californicus)*	1
California Pocket Gopher *(Thomomys bottae bottae)*	84
California Pocket Mouse *(Perognathus californicus californicus)*	4
Long-tailed Harvest Mouse *(Reithrodontomys megalotis longicaudus)*	26
White-footed mice *(Peromyscus* sp.?)	52
California Meadow Mouse *(Microtus californicus californicus)*	276
Norway Rat *(Rattus norvegicus)*	2
House Mouse *(Mus musculus* subsp.?)	37
Brush Rabbit *(Sylvilagus bachmani* subsp.?) (half-grown young)	2
Santa Cruz Song Sparrow *(Melospiza melodia santaecrucis)*	1
Jerusalem Cricket *(Stenopalmatus* sp.?)	3

As compared with Professor Foster's findings *(loc. cit.)* it may be noted that in each case California Meadow Mice constituted more than 50 percent of the total number of individuals accounted for. California Pocket Gophers rank second, in number of individuals represented, in pellets from the church tower (perhaps due to our having picked up the larger, more intact pellets), but white-footed mice hold second place in the remains from Wild Cat Canyon. The greater number of species represented at Wild Cat Canyon probably is explained by the law of averages, since Professor Foster identified 1780 individual animals, and only 484 were secured from the church tower. The greater number of House Mice found in the church tower is hard to explain. Whether or not House Mice are more abundant near the city than

farther from it, in such a place as Wild Cat Canyon, I do not know. Finding of the Santa Cruz Song Sparrow is worthy of note because no bird remains were found in the pellets from Wild Cat Canyon.

The nature of the food of the Barn Owls living in the church tower indicates that they fed in the Berkeley Hills to the eastward. At his home at 300 Panoramic Way, which is at the eastern margin of the residential district and well up on the west side of the Berkeley Hills, the writer has heard as many as seventeen Barn Owls pass over, or near, his house on a summer's evening. All these birds were flying east or west, never, so far as noted, north or south, thus suggesting that they were birds making trips between their foraging-grounds in the hills and their young at roosts in the city. Indeed, on two occasions, a Barn Owl was seen carrying some mammal of pocket gopher size westward down the hill. These facts and knowledge of the existence of several occupied roosts of Barn Owls in buildings on or near the University of California Campus argues the existence of a large local population of these birds. Probably these owls are less seriously molested by man than those in the open territory outside the city limits; for these latter, as on occasion the writer has seen, provide irresistible targets for hunters. Taking account of the large area in the East Bay region that is built up and that provides shelter and nesting sites for this concentrated population of Barn Owls, it is conceivable that the rodent population in the Berkeley Hills, especially in the territory immediately adjacent to the eastern city limits, would be appreciably reduced by the foraging activities of these birds.

It is a fact that meadow mice are fewer along the eastern city limits than farther east. Near the crest of the Berkeley Hills, from one to one and one-half miles east of the city limits of Berkeley, counts of individuals of California Meadow Mice, seen per hour of walking during afternoons and evenings, indicate a population three times as dense as similar counts indicate to exist at most places within one-half mile of the city limits where Barn Owls frequently have been seen foraging. It is not, of course, known that Barn Owls alone are responsible for the lesser number of mice in the area mentioned; in fact, it is inferred that they alone are not responsible. For one thing, cats are more numerous about the city limits than one or two miles outside, and they feed partly on mice. Nevertheless, the Barn Owls constitute one of the conspicuous factors limiting the mouse population.

Just what human values attach to this interrelation, I am not certain; but the utilitarian-minded will infer that this belt, with a relatively small meadow mouse population along the city limits, functions as a protection to the well-watered, green lawns in the city. These lawns the meadow mice would seriously damage during the dry season, if a sufficient population could exist in proximity to them. Thus a possible conclusion is that, in Berkeley, a sufficient population of Barn Owls is one factor in maintaining attractive lawns!—E. RAYMOND HALL, *Museum of Vertebrate Zoology, University of California, Berkeley, California, September 8, 1927.*

Notes from the Three Barkerville Banding Stations.—The banding stations of this promising group, described by Mr. McCabe in the July, 1927, number of THE CONDOR, already have furnished some notes worthy of record.

Under date of May 5, 1927, Mr. J. D. Cochran writes: "The condition of the spring birds in this locality may be of interest. During April 16, 17 and 18 we experienced a bad storm, the thermometer dropping to two below zero. The Game Warden reported many dead birds along his route, though we found only two near our feeding station; perhaps this was due to the fact that we fed very heavily and did no trapping for banding during the storm. In both cases the bird found dead was empty of crop and very poor, apparently having just arrived. Birds banded previous to the storm had some difficulty with the ice and snow balling up on the band; however, I discovered no ill results from it.

"During the ten years in which we have afforded the birds a feeding station we have never before seen such a variety in attendance. Although the spring is late, according to our records dating back ten years, the birds are arriving at their usual time. So far we have banded 100 Gray-crowned Leucosticte, besides a number of Gambel Sparrows, Song Sparrows and a few other birds."

Writing on June 8, 1927, Mr. T. T. McCabe says that during the month following their return from California, April 7 to May 7, Mrs. McCabe and he banded about 1100

birds; and Mr. Edwards recently had an S. O. S. call for an emergency supply of bands, so they must be keeping up the good work. Mr. McCabe writes: "Yesterday we rode twenty-three miles, largely through willow, and it is no exaggeration to say that for every twenty yards there was a Rufous Hummingbird, many of them doing their amazing courtship performance. Whether it is a case of arrested migration (the spring has been very late) or whatever the cause, this is a year out of a century as far as birds go." In a later letter Mr. McCabe reports that between 300 and 400 birds have been banded this spring at the station of Mr. and Mrs. Joseph Wendle.

These stations are doing splendid work. We are looking forward to valuable results in regard to the movements of their birds from station to station, and we strongly hope that they will get some of the birds banded at southern stations and vice-versa. Already Mr. Cochran reports the recapture at his station of a Junco which had been banded at the McCabe station eighteen miles away. — HAROLD MICHENER, *418 Elm Avenue, Pasadena, California, July 22, 1927.*

EDITORIAL NOTES AND NEWS

Our fellow member, Mrs. F. T. Bicknell, of Los Angeles, has brought forward an issue which should interest bird students, generally, whether or not resident in California. As yet, there is no "state bird" for California. Kansas has the Meadowlark, Texas has the Mockingbird; what bird should be named as California's State Bird? We have heard numerous suggestions already; and we have our own ideas. Among the candidates mentioned the California Condor looms; but this bird is not associated in the layman's mind with the poppies! No doubt whatsoever the Wrentit is ornithologically the most unique bird of California; but it is not widely known to the bird-loving public. The Canyon Wren is another suggested species; but it is of exceedingly local occurrence, and therefore known to but few people. Now, as an undoubtedly useful step toward the ultimate selection of a State Bird for California, the Editor of THE CONDOR hereby invites a postal card vote from members of the Cooper Ornithological Club everywhere. Nominate your choice and send your nomination to THE CONDOR Editor, Museum of Vertebrate Zoology, University of California, Berkeley, not later than January 1, 1928. Give, briefly, reasons that you would urge for your candidate. In the following number of THE CONDOR we will give the result of the vote and a summary of the reasons.

For the past several years we have received greatly appreciated assistance in preparing the annual index to THE CONDOR from Mr. Frank N. Bassett. This year, Mr. Bassett was excused from this service, on excellent grounds; and we had to seek help elsewhere. To Mrs. Amelia S. Allen we are indebted for preparation of the Index to Volume XXIX, appearing as part of the present number.

Americans have welcomed the opportunity this fall of making the personal acquaintance of several world known ornithologists from abroad. Various ornithological centers on both coasts have been visited by Mr. Jean Delacour of Paris, Mr. M. U. Hachisuka of Tokyo, and Mr. Gregory M. Mathews of London. It has been a real pleasure to meet these accomplished gentlemen. Also, the conversations held have availed much of practical benefit. Exchange of views has measureably enlarged our own grasp of certain general questions in our field of science.

Our January issue, already in press, will be the largest single number in the history of our magazine. It will be occupied largely by Mr. Harry Harris's exhaustive "Biography of Robert Ridgway", this to be accompanied by fifty illustrations. This contribution, we are confident, is literarily and historically of high order of merit and will be widely read and appreciated, especially by the hosts of friends and admirers of Mr. Ridgway himself.

PUBLICATIONS REVIEWED

HENDERSON'S "PRACTICAL VALUE OF BIRDS".*—This volume proves to be the most useful book yet available for supplying information in economic ornithology. The tenor throughout is calm, sane, nonsentimental. There is no element of disputation; indeed, moot ground appears to

* The | Practical Value | of Birds | by | Junius Henderson | Professor of Natural History and Curator of Museum, | University of Colorado | New York | The Macmillan Company | 1927; demy 8vo, pp. xii + 342; $2.50. Our copy purchased August 9, 192".

have been pretty well avoided, or else differing opinions are cited without sides being taken. A vast amount of basic detail is given in small compass; and this is fortified by an abundance of original citations, together with an exhaustive terminal bibliography.

Professor Henderson gives a broad interpretation of the word "practical": "Whatever tends to make the world better and happier; whatever ministers to the esthetic longings of the human soul; whatever leads the thoughts of men and women for the moment from the sordid pursuit of gain or from the race for personal aggrandizement to beauty in any form; whatever entices tired and care-worn people for a time from the shop, or office, or store, or mine, or quarry, and brings them into closer contact with the beauty, grace and charm of things out-of-doors; is of direct material value to the human race, even though that value may not be measureable in yards, acres, tons, bushels or dollars." With this definition everyone, surely, will heartily agree.

The reader finds the work of special students of the food of birds, such as McAtee, Beal, Kalmbach and Wetmore, summarized, so that essentials are available in small space. The author has also gone through the entire literature relating to this subject with extreme thoroughness. The reviewer knows pretty well, for instance, the content of the 28 volumes of THE CONDOR, and he has been unable to recall anything really important that is omitted and that should have been considered in a book of the present nature. For example, we find reference to Bassett's observation of siskins shelling grubs from leaf-galls; to McGregor's observation of woodpeckers as fly-catchers; to Law's record of a Road-runner killing a Golden-crowned Sparrow in a bird trap; to Tyler's itemization of the food of Barn Owls; and to Wyman's interesting case of a Red-tailed Hawk capturing pigeons. In Henderson's book we have an excellent illustration of how widely scattered observations may be gathered together into one volume where available in connection with a single field of significant fact and special bearing.

In a book of less than 350 pages the reader cannot expect to find exhaustive treatment of all of the numerous subjects dealt with. But we do find a fair digest, as well as a guide to numerous sources. Some of the subjects summarized are as follows: the balance of nature; the function of birds in nature; complete protection of birds not desirable; birds as enemies of injurious mammals; birds as disease carriers; remedies. These are only a few of the chapter headings.

Henderson's book is not one that will appeal to the sentimental bird lover. It will, however, meet in admirable measure the needs of the general ornithologist, the teacher of biology in colleges and high schools, the forest zoologist, and the economic entomologist.—J. GRINNELL, *Berkeley, California, August 12, 1927.*

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

AUGUST.—The August meeting of the Northern Division of the Cooper Ornithological Club was held in room 101, Zoology Building, University of California, Berkeley, on August 25, 1927, at 8:00 p. m. In the absence of president and vice-president, Mr. Lastreto was asked to occupy the chair. Minutes of the Northern Division for July were read and approved. Minutes of the Southern Division for July were read.

The following proposals for membership were made: Mary S. Albro, 1801 Highland Place, Berkeley, California, proposed by Susan E. Chattin; Ruth E. Bailey, 1022 Spruce Street, Berkeley, by Wm. E. Ritter; William H. Burt, Berkeley, by E. Raymond Hall; Jean Delacour, Chateau de Clères, Seine Inférieure, France, by Margaret W. Wythe; Masa Ujii Hachisuka, Mita Shiba, Tokyo, Japan, by Margaret W. Wythe; Mrs. Vivian Reif, 2033 Hearst Avenue, Berkeley, by Roswell S. Wheeler; Josephine E. Smith, 1801 Highland Place, Berkeley, by Margaret W. Wythe; R. A. Stirton, Berkeley, by E. Raymond Hall; George C. Wood, Danville, California, by J. Grinnell.

Mrs. Junea W. Kelly reported the nesting of White-throated Swifts at Leona Heights Quarry, near Oakland, and stated that at least twelve of the birds had been seen. Mr. H. S. Swarth spoke briefly of Thomas Bridges, of the part he carried in the growth of early California ornithology, and of his death at sea on September 9, 1865, and his burial in an unmarked grave in San Francisco. Mr. Swarth stated that he had been urged by Dr. Theodore S. Palmer to bring before the Northern Division the suggestion that certain scientific societies about the Bay unite to erect a suitable memorial above the grave. Mrs. Kibbe stated that the Audubon Association

of the Pacific would aid in such a movement. Dr. Evermann thought that the Academy of Sciences would contribute; and Mr. Swarth said that the Botanical Society had agreed to help. Mr. Harwell made a motion that the chair appoint a committee to take charge of the matter. The motion was duly seconded and Mr. Dixon moved an amendment, that the committee be empowered to solicit and accept funds. Both amendment and motion were duly carried, and the chair appointed Mr. Swarth and Dr. Evermann to serve.

It was the good fortune of the Northern Division to have present for the evening Dr. Loye Miller, President of the Board of Governors. Mr. Grinnell resigned his place upon the program in favor of Dr. Miller, who expressed his pleasure at meeting with the Division and told of his absorbing interest in the fossil birds of California and the rapid accumulation of material since Dr. Lucas described the first fossil bird from the State twenty-six years ago. Since then there have been recorded one hundred and six fossil species, represented in many cases by extensive series of bones. So interested were Dr. Miller's hearers that had such a thing been feasible an outing meeting would have been embarked upon at once to visit the Miocene shallows of the Lompoc embayment.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

SOUTHERN DIVISION

JULY.—The regular monthly meeting of the Cooper Ornithological Club, Southern Division, was held at the Los Angeles Museum, Exposition Park, Los Angeles, on July 26, 1927. In the president's absence, the meeting was called to order at 8:15 p. m. by vice-president Chambers with about twenty-five members and friends present. The minutes of the June meeting of the Southern Division were read and approved.

The following applications for membership were read: James Spear, Jr., Wallingford, Pa., and Benjamin Walworth Arnold, New York State Bank Building, Albany, New York, both by W. Lee Chambers; Granville Plumber Ashcroft, 6516 Hubbard St., Culver City, Calif., and Ronald Harrison Coombs, 642 Duquesne Ave., Culver City, Calif., both by George G. Cantwell.

The speaker of the evening, Mr. George G. Cantwell, told of a three months' trip in which he and Mr. Paul E. Trapier covered nearly all the state of Arizona, gathering final bits of information needed by the Bureau of Biological Survey to complete the forthcoming Biological Survey of Arizona. They were collecting mammals, birds, reptiles and insects, so their time was very fully occupied even when winds, cloud-bursts, and automobile trouble necessitated delays in travel. They collected some rare specimens, among them being a pair of Flammulated Screech Owls. After describing their trip twice across the state, then into the extreme northeastern corner, then to Gallup, New Mexico, and home via the highway along the Santa Fe railroad, Mr. Cantwell passed around some photographs showing the country through which they had passed.

Adjourned.—HAROLD MICHENER, *Secretary.*

AUGUST.—The regular meeting of the Southern Division of the Cooper Ornithological Club was held on August 30, 1927, at 8:00 p. m. at the Los Angeles Museum, Exposition Park, 15 members and friends being present. In the absence of the president and vice-president, Dr. Comstock was asked to take the chair. The minutes of the July meeting of the Southern Division were read and approved. The minutes of the July meeting of the Northern Division were read.

A letter from Mr. H. S. Swarth was read in which it was stated that the Northern Division had voted to help the Audubon Association of the Pacific, the California Academy of Sciences and the California Botanical Society in erecting a tombstone over the grave of Thomas Bridges, the first resident ornithologist in California, and asking that the Southern Division obtain some contributions to that end. It was moved, seconded and carried that the secretary reply to Mr. Swarth saying that the Southern Division will undertake to collect some money for that purpose.

There being no prepared program, the chairman asked for items of interest from those present. Mr. Robert T. Moore told in a general way of his recent visit to Ecuador where he devoted particular attention to hummingbirds. All present know that a treat is in store for the October meeting at which Mr. Moore will be the speaker of the evening. After a general discussion the meeting adjourned.—HAROLD MICHENER, *Secretary.*

INDEX TO VOLUME XXIX

A

Abbott, Clinton G., Sabine gull off San Diego County, 73; American dipper established as a breeding species in San Diego county, 117; notes on the nesting of the band-tailed pigeon, 121; black-and-white warbler again in San Diego county, 128; mid-winter nesting in southern California, 160; western bluebird nesting in the city of San Diego, 165; elegant terns at San Diego, 171; another man-o'-war-bird wanders into California waters, 272
Acanthis linaria linaria, 114
Accipiter, 207
cooperi, 198
velox, 59
Actitis macularia, 66
Æchmorhynchus parvirostris, 226
Agelaius phoeniceus, 198
phoeniceus nevadensis, 198
phoeniceus sonoriensis, 157, 198
Ajaia ajaja, 253
Alexander, Annie, M., a further chronicle of the passenger pigeon and of methods employed in hunting it, 273
Ammodramus halophilus, 243
Amphispiza bilineata deserticola, 70
Anas platyrhynchos, 197
Anhinga anhinga, 26
Ani, Black, 228
Anthus rubescens, 243
Antrostomus carolinensis, 26
vociferus, 26, 27
Aphelocoma californica, 234
woodhousei, 198
Aphriza virgata, 3
Aquila, 150
chrysaetos, 59
Archilochus alexandri, 198
Ardea herodias, 243
herodias hyperonca, 40, 69
herodias sanctilucae, 40, 156
herodias treganzai, 40, 197
Arenaria interpres, 70
interpres morinella, 240
melanocephala, 70
Asio, 150
flammeus, 156, 200
Astragalinus psaltria hesperophilus, 160, 199
Astur, 170
atricapillus atricapillus, 113
Asyndesmus lewisi, 124, 165, 198
Atthis heloisa heloisa, 119
heloisa morcomi, 118
morcomi, 118
Auklet, Cassin, 68, 188, 206
Crested, 232
Averill, C. K., emargination of the long primaries in relation to power of flight and migration, 17
Avocet, 197, 253

B

Balanosphyra formicivora bairdi, 233
Bancroft, Griffing, breeding birds of Scammons Lagoon, Lower California, 29; notes on the breeding coastal and insular birds of central Lower California, 188
Bangs, Outram, Atthis heloisa morcomi Ridgway not a valid subspecies, 118
Bickford, E. L., western robin nesting at Napa, 163
Bishop, Louis B., the meeting place of the California and white-rumped shrikes, 78; the plumage of certain gulls, 201; the status of the Point Barrow gull, 204
Bittern, 147
American, 242
Least, 156
Blackbird, 74
Brewer, 65, 140, 199
Red-winged, 18, 65, 142, 147, 198
Rusty, 227
Sonoran Red-winged, 157
Bluebird, 147, 236
Chestnut-backed, 200
Mountain, 64, 65, 66, 108, 154, 200
Western, 165
Bob-white, 147
Bombycilla cedrorum, 59
garrula pallidiceps, 59
Booby, 192, 232
Blue-footed, 155, 193
Brewster, 155, 193
Botaurus lentiginosus, 242
Brachyramphus hypoleucus, 68
Brant, Black, 58, 170, 243
Black Sea, 69, 242
Branta canadensis hutchinsi, 170
nigricans, 58, 69, 170, 242
Brooks, Allan, notes on Swarth's report on a collection of birds and mammals from the Atlin region, 112; breeding of immature hawks, 245; can hawks prevent mouse plagues, 249
Bubo, 159, 170
virginianus, 26, 114, 169
virginianus pacificus, 26, 65
virginianus pallescens, 26, 198
virginianus subarcticus, 114

Bufflehead, 240
Bunting, Indigo, 147, 159
Lark, 203
Painted, 147
Bush-tit, 74
Buteo, 170, 245, 249
abbreviatus, 156
borealis alascensis, 114
borealis calurus, 70, 114, 198
borealis harlani, 114
borealis krideri, 114
Butorides virescens, 26
virescens frazari, 194, 241

C

Calamospiza melanocorys, 203
Calcarius ornatus, 159
Calidris alba, 58, 69, 156, 242
Calypte anna, 160, 171
Canvas-back, 197
Caprimulgus, 27
Cardinal, 101, 146, 245
Cardinalis cardinalis, 245
cardinalis cardinalis, 101
cardinalis superbus, 245
Carpodacus cassini, 65, 158
mexicanus frontalis, 199
Casmerodius albus egretta, 26
egretta, 194, 241
Catbird, 101, 147, 227
Catharista, 150
Cathartes aura septentrionalis, 153, 243
Cathartornis, 150
Catherpes mexicanus conspersus, 157, 199
Catoptrophorus semipalmatus inornatus, 69, 240
Celeus castaneus, 166
Centrocercus urophasianus, 198
Centurus blakei, 227
uropygialis, 162
uropygialis brewsteri, 168
uropygialis cardonensis, 168
uropygialis uropygialis, 168
Certhia familiaris occidentalis, 60
familiaris zelotes, 65
Ceryle alcyon, 198
alcyon caurina, 70
Charadrius nivosus, 49, 69, 194
nivosus nivosus, 242
semipalmatus, 69
Charitonetta albeola, 240
Chat, Long-tailed, 199
Chickadee, Mountain, 63, 108
Plumbeous, 102, 146
Short-tailed Mountain, 65
Chlidonias nigra surinamensis, 140, 155
Chordeiles acutipennis, 28
acutipennis texensis, 26
virginianus hesperis, 64, 65, 66
Chuck-will's-widow, 27
Ciccaba virgata virgata, 26
Cinclus mexicanus unicolor, 66, 117, 199
Circus hudsonius, 70
Clabaugh, Ernest D., curious perching behavior of English sparrow, 81
Clangula hyemalis, 112
Coccyzus, 18
americanus occidentalis, 157
ferrugineus, 230
Cochlearius, 27
zeledoni, 26
Colaptes auratus, 121
auratus borealis, 59
cafer, 59, 121
cafer collaris, 65, 158, 198, 200
Columba fasciata fasciata, 121, 124, 153
Colymbus dominicus brachypterus, 155
nigricollis californicus, 68, 243
Condor, California, 129
Conopoderas percernis, 228
rava, 226
Cooper Ornithological Club, annual meeting, 53, 128; governors' meeting, 212; minutes of monthly meetings, 85, 130, 174, 209, 250, 277
Coot, 197, 253
American, 156
Cormorant, 273
Baird, 193
Brandt, 69, 163, 193
Farallon, 40, 46, 69, 163, 193
Farallon Double-crested, 206, 243
Florida, 273
Pelagic, 59
Short-winged, 229
Corvus brachyrhynchos hesperis, 198
corax, 54
corax clarionensis, 70
corax sinuatus, 195, 206, 243
Cowbird, 147
Dwarf, 198, 271
Crane, Sandhill, 118
Creagrus furcatus, 231
Creeper, Sierra, 65
Crossbill, 112
Bendire Red, 124
Mexican, 153
Mexican Red, 125
Sierra, 82
Crotophaga ani, 228
Crow, Western, 198
Cryptoglaux acadica acadica, 161
Cuckoo, California, 157
Yellow-billed, 147
Curlew, Hudsonian, 69, 242
Long-billed, 69, 242
Cyanocephalus cyanocephalus, 198
Cyanocitta cristata bromia, 80
cristata cristata, 80
stelleri diademata, 80
stelleri frontalis, 65
Cypseloides niger borealis, 89

D

Dafila acuta tzitzihoa, 115, 243
De Groot, Dudley Sargent, the California clapper rail: its nesting habits, enemies and habitat, 259
Dendragapus obscurus, 197
obscurus fleming, 113, 169
obscurus richardsoni, 113
obscurus sierrae, 65
Dendroica, 241
aestiva sonorana, 199
auduboni, 19, 64, 115
auduboni auduboni, 65, 70, 199
bryanti castaneiceps, 195, 241
cerulea, 126
occidentalis, 64, 65
Dichromanassa rufescens dickeyi, 42, 241
Dickcissel, 147, 157
Dipper, 19
American, 66, 117
Dixon, Joseph, the surf-bird's secret, 3; contribution to the life-history of the Alaska willow ptarmigan, 213; black bear tries to gnaw into a woodpecker's nest, 271
Dove, 231
Mourning, 123, 147
Western Mourning, 198
White-winged, 153
Dowitcher, Long-billed, 242
Dryobates scalaris cactophilus, 198
villosus orius, 65
Duck, American Golden-eye, 112
American Pintail, 243
Bufflehead, 240
Canvas-back, 197, 243
Fulvous Tree-, 253
Greater Scaup, 112
Green-winged Teal, 197
Lesser Scaup, 112, 243
Mallard, 253
Old-squaw, 112
Pintail, 115, 253
Redhead, 197, 253
Ruddy, 253
Shoveller, 253
Steamer, 228

E

Eagle, 17
Golden, 172, 198, 263, 269
Southern Bald, 153
Ectopistes migratorius, 273
Egret, American, 194, 241
Brewster, 44, 46
Brewster Snowy, 40, 42, 46
Lower California Reddish, 42, 43, 57, 241
Snowy, 29
Egretta thula brewsteri, 42, 241
thula thula, 42
Elanus, 150
Empidonax, 66
difficilis, 20
difficilis difficilis, 153
trailli, 198
wrighti, 198
Endomychura craveri, 188
hypoleuca, 188
Ereunetes mauri, 69, 242
pusillus, 58
Euphagus carolinus, 59
cyanocephalus, 199
Eupoda montana, 69
Euthlypis lachrymosa tephra, 126

F

Falco, 150
Falco fulvigularis, 150, 151
fusco-caerulescens, 151
islandus, 152
mexicanus, 82, 118, 150, 151, 152, 194
peregrinus, 150, 151, 152
peregrinus anatum, 70, 82, 194, 206, 242
rusticolus, 158
sparverius, 70, 150
sparverius phalaena, 198
sparverius sparverius, 59
swarthi, 151, 152
Falcon, 17, 245
Aplomado, 150
Peregrine, 246
Prairie, 10, 82, 118, 150, 194, 263, 268
Swarth, 152
Finch, Cassin Purple, 65, 153
Geospiza, 229
House, 74, 199, 237, 238
Purple, 74
Flicker, Red-shafted, 65, 147, 158, 198, 200
Yellow-shafted, 59
Flycatcher, 66, 236
Acadian, 147
Arizona Sulphur-bellied, 126
Ash-throated, 159
Colombian Royal, 126
Crested, 147
Derby, 73
Olive-sided, 65, 120, 121, 198
Scissor-tailed, 147
Traill, 198
Vermilion, 77, 196, 198
Western, 20, 153
Wright, 198
Foster, G. L., a note on the dietary habits of the barn owl, 246
Fregata aquila, 272
minor palmerstoni, 193, 242
Fringillidae, 229
Fulica americana, 59, 156, 197
Fulmar, 200
Fulmarus glacialis, 206

G

Gallinago delicata, 79, 163, 197
Gallinula chloropus cachinnans, 156
Gallinule, Florida, 156
Gander, Frank F., the fly-catching habits of the Anna hummingbird, 171; the cardinal in San Diego, 245; western wood pewees and dwarf cowbirds nesting in San Diego, 271
Gannet, 232
Gavia, 68
  pacifica, 155, 207
Gelochelidon nilotica aranea, 253
Geococcyx californianus, 196, 198, 273
Geothlypis trichas occidentalis, 199
Geranoaëtus, 150
Gignoux, Claude, shrike attacking snake, 75; western mockingbird in Contra Costa county, 81; Audubon warbler eating grapes, 115
Glaucidium brazilianum ridgwayi, 26
Glaucionetta clangula americana, 112
Gnatcatcher, Blue-gray, 147
Goatsucker, Giant, 25, 27
Godwit, Marbled, 69, 242
Golden-eye, American, 112
Goldfinch, 239
  Green-backed, 160, 199
Goose, Barred Magellan, 229
  Hutchins, 170
Goshawk, 169, 245
  Eastern, 113
Grackle, 140
  Bronzed, 147
Grebe, American Eared, 68, 243
  Eared, 253
  Mexican, 155
  Pied-billed, 155
Grinnell, J., a proposed summation of Lower California ornithology, 76; designation of a Pacific coast subspecies of chipping sparrow, 81; notice of Hopkinson's records of birds bred in captivity, 85; notice of Thomson's problems of bird-migration, 85; notice of Walters' wild birds in city parks, 85; a new race of crissal thrasher from northwestern Lower California, 127; the rock wren of San Nicolas Island not a recognizable subspecies, 165; a new race of Gila woodpecker from Lower California, 168; review of Hoffmann's birds of the Pacific states, 208; review of Henderson's practical value of birds, 276
Grinnell, J., and Lamb, C. C., new bird records from Lower California, 124
Grinnell, J., and Shaw, Tsen-Hwang, review of Kuroda's birds of Fuji-yama, 173
Grosbeak, Blue, 147
  California Evening, 65
  California Pine, 65
  Pine, 63, 112, 207
Grouse, Dusky, 197
  Fleming, 113, 169
  Ruffed, 245
  Sierra, 65
Grus mexicana, 118
Guara alba, 156, 194, 242
Gull, 232
  Bonaparte, 242
  California, 163, 240
  Fork-tailed, 231
  Franklin, 140
  Glaucous-winged, 68, 240
  Heermann, 68, 163, 180, 205
  Point Barrow, 204
  Ring-billed, 68
  Sabine, 73
  Short-billed, 214, 216, 219, 221
  Silver, 183
  Southern Western, 189, 206, 243
  Western, 30, 31, 67, 68, 163, 206
  Yellow-legged, 189
Gymnogyps, 150
Gyrfalcon, 223
  Gray, 158
  White, 150

H

Haematopus bachmani, 51, 52, 70, 80, 194
  frazari, 52
  palliatus frazari, 70, 194, 206, 243
Haliaeëtus leucocephalus leucocephalus, 153
Halocyptena microsoma, 72, 190
Hall, E. Raymond, a commensal relation of the California quail with the California ground squirrel, 271; the barn owl in its relation to the rodent population at Berkeley, California, 274
Hanna, Wilson C., most southerly breeding record of Wilson snipe in California, 163
Hang-nest, 228
Harris, Harry, John Ridgway's drawings for the Bendire plates, 177
Hawk versus mouse, 172, 249, 250
Hawk, 207
  American Duck, 242
  American Rough-leg, 114
  Black Pigeon, 72
  Broad-winged, 48
  California Squirrel, 249
  Cooper, 198, 245, 246, 263, 269
  Desert Sparrow, 198
  Duck, 70, 82, 150, 194, 206, 216, 263, 268, 269
  Ferruginous Rough-leg, 249, 268
  Fish, 17

Hawk [continued]
Harlan, 114, 170
Marsh, 70, 249, 265
Pigeon, 246
Red-bellied, 249
Red-shouldered, 147
Red-tailed, 65, 147, 234, 263, 265, 269
Sharp-shinned, 245, 246
Sparrow, 10, 65, 70, 147, 151, 249, 265
Swainson, 114
Western Red-tailed, 70, 114, 198
Zone-tailed, 156
Hen, Sage, 198
Henderson, Junius, the blue jay at Boulder, Colorado, 80
Herodiones, 193
Heron, Bancroft Yellow-crowned Night, 167, 241
Black-crowned Night, 45, 46, 197, 241, 265
Brewster Snowy, 241
California Blue, 44, 69
Espiritu Santo, 40
Frazar Green, 194, 241, 243
Great Blue, 40, 193, 194, 243, 265
Louisiana, 42, 44, 46, 47, 241, 242
Night, 26, 42
Pallid Great Blue, 197
San Lucas Blue, 156
Yellow-crowned Night, 44, 46, 47, 167
Herpetotheres, 150
Hesperiphona vespertina californica, 65
Heterocnus cabanisi, 26
Heteroscelus incanus, 69, 156
Himantopus mexicanus, 82
Hirundo, 104
erythrogaster, 199
Hoffmann, Ralph, nesting of the sandhill crane in Modoc county, 118; pectoral sandpiper in Washington in spring, 128; the Gila woodpecker at Holtville, Imperial county, California, 162; the Lewis woodpecker apparently nesting in Gustine, Merced county, California, 165; Cassiar junco wintering in southern Santa Barbara county, California, 171.
Howell, A. Brazier, poor-wills attracted by arc light, 76
Huey, Laurence M., additional bird records from Lower California, 153; a Pacific coast race of the yellow-crowned night heron, 167; northward migration of Pacific loons, 202; northernmost breeding station of the Heermann gull on the Pacific Ocean, and other notes from San Roque Island, Lower California, 205; the bird life of San Ignacio and Pond lagoons on the western coast of Lower California, 239
Hummingbird, Allen, 203
Anna, 65, 160, 171
Black-shinned, 198
Calliope, 19, 63, 66, 124
Rufous, 71, 72, 276
Hydranassa, 44, 45, 47
tricolor ruficollis, 46, 241
Hydroprogne caspia imperator, 155, 240
Hylocichla fuscescens salicicola, 20
guttata auduboni, 20
guttata sequoiensis, 64, 65
ustulata, 66
ustulata ustulata, 154

I

Ibis, White, 156, 194, 242
White-faced Glossy, 253
Ibycter, 150
Icteria virens longicauda, 199
Icterus, 18
bullocki, 199
sclateri, 75
sclateri alticola, 75
sclateri pustuloides, 76
sclateri sclateri, 76
Iridoprocne bicolor, 63, 66
Ixobrychus exilis hesperis, 156
Ixoreus naevius, 60, 204
naevius meruloides, 19, 154

J

Jacksnipe, 79
Jaeger, Parasitic, 243
Jay, Blue, 80, 103, 147
Blue-fronted, 65
California, 234, 235
Long-crested, 80
Pinyon, 159, 198
Woodhouse, 198
Junco, 138, 146, 237
Cassiar, 171
Pink-sided, 199
Shufeldt, 199, 272
Sierra, 64, 65, 66, 116, 162, 171
Junco hyemalis connectens, 171, 199
hyemalis mearnsi, 199
oreganus thurberi, 64, 65, 66, 116, 171
Junco-Zonotrichia, 226

K

Killdeer, 69, 197, 203, 242, 253
Kingbird, 147
Arkansas, 198, 203
Eastern, 77
Western, 82
Kingfisher, Belted, 73, 198
Texas, 80
Western Belted, 70, 243
Kinglet, Golden-crowned, 19, 147
Ruby-crowned, 20, 64, 147, 200
Western Golden-crowned, 82
Western Ruby-crowned, 65

Kite, White-tailed, 265
Kittiwake, Pacific, 73

L

Lagopus, 170
dixoni, 113
lagopus alascensis, 213
leucurus, 204
leucurus altipetens, 204
rupestris, 113
Lamb, Chester C., the birds of Natividad Island, Lower California, 67; notes on some birds of the southern extremity of Lower California, 155
Lamb, C. C., and Grinnell, J., new bird records from Lower California, 124
Lanius borealis, 60, 205
ludovicianus excubitorides, 75, 78, 199
ludovicianus gambeli, 78
ludovicianus nelsoni, 240
mollis, 205
Lark, Desert Horned, 124, 198
Horned, 206, 240
Island Horned, 70
Lower California Horned, 70
Larus argentatus, 202
barrovianus, 204
californicus, 202, 240
delawarensis, 68
glaucescens, 68, 201, 240
heermanni, 34, 68, 163, 189, 205
hutchinsii, 201
hyperboreus, 201, 204
novae-hollandiae, 183
occidentalis, 58, 68
occidentalis livens, 30, 189
occidentalis wymani, 30, 189, 206, 243
philadelphia, 242
Leach, Frank A., feed-table observations from Diablo, 74; strange features in bird habits, 233
Leopold, Aldo, the whistling note of the Wilson snipe, 79
Leucosticte tephrocotis littoralis, 59
Leucosticte, Gray-crowned, 275
Limnodromus griseus scolopaceus, 242
Limosa fedoa, 69, 242
Lincoln, Frederick C., a note on the longevity of the pintail, 115; status of the yellow-legs in Arizona, 164
Longspur, Chestnut-collared, 159
Loon, 68
Pacific, 155, 202
Lophodytes cucullatus, 59
Lophortyx californica, 164
californica californica, 271
gambeli, 196, 197
Loxia curvirostra bendirei, 82, 124
curvirostra stricklandi, 125, 153

M

Macaw, Scarlet, 228
Magpie, 198, 249
American, 244
Yellow-billed, 11
Mailliard, Joseph, banding of Gambel sparrows in the fall of 1926, 98; additional breeding records of the spotted and saw-whet owls in California, 160
Mallard, 197, 253
Man-o'-war-bird, 272
Pacific, 193, 242
Marila affinis, 112
americana, 197
marila, 112
valisineria, 197
Martin, Western, 157, 163
Mattingley, Arthur H. E., cormorants in relation to fisheries, 182
McCabe, T. T., bird-banding near Barkerville, British Columbia, 206
McCabe, Thomas T., and McCabe, Elinor Bolles, analysis of sexes in a junco migration, 272
Meadowlark, Western, 147, 157, 160, 199
Megaceryle alcyon caurina, 243
Melanitta perspicillata, 243
Melopelia asiatica trudeaui, 153
Melospiza lincolni, 157
lincolni lincolni, 66
melodia fallax, 199
melodia santaecrucis, 272
Merganser, Red-breasted, 69, 240, 243
Mergus serrator, 69, 240
Michael, Charles W., black swifts nesting in Yosemite national park, 89; pygmy owl: the little demon, 161
Michener, Harold, traps for banders, 116; notes from the three Barkerville banding stations, 275
Microcarbo melanoleucus, 182
Micromonacha lanceolata austinsmithi, 73
Micropallas whitneyi sanfordi, 157
Miller, Loye, the painted redstart as a California bird, 77; the falcons of the McKittrick Pleistocene, 150
Mills, Dr. H. W., notice of death of, 208
Mimocichla rubripes, 228
Mimus orpheus, 227
polyglottos leucopterus, 81, 82, 196, 199, 240
Mniotilta varia, 128, 157
Mockingbird, 227, 273
Western, 81, 82, 103, 147, 196, 199, 240
Molothrus ater obscurus, 198, 271
Mouse versus hawk, 172, 249, 250
Murre, 232
Murrelet, Ancient, 163
Craveri, 158
Xantus, 67, 68, 188
Muscivora, 18
Myadestes townsendi, 65

Myiarchus, 18
Myiarchus cinerascens, 159
Myiochanes richardsoni, 64, 271
richardsoni richardsoni, 65
Myiodynastes luteiventris luteiventris, 126
luteiventris swarthi, 126

N

Nannus hiemalis pacificus, 20
Neogyps, 150
Neophrontops, 150
Nesotriccus ridgwayi, 230
Nettion carolinense, 197
Nice, Margaret Morse, experiences with cardinals at a feeding station in Oklahoma, 101; seasonal fluctuations in bird life in central Oklahoma, 144
Nighthawk, 17
Pacific, 64, 65, 66
Texas, 28
Numenius americanus, 69, 242
hudsonicus, 69
Nutcracker, Clark, 108
Nuthatch, Red-breasted, 65
Slender-billed, 65
Nuttallornis borealis, 65, 120, 198
Nyctanassa, 47
violacea, 26
violacea bancrofti, 167, 241
violacea violacea, 167
Nyctibius, 27
griseus, 25
Nycticorax nycticorax naevius, 26, 197, 241
Nyctidromus albicollis, 26, 27
Nyroca affinis, 243
valisineria, 243

O

Oceanodroma melania, 190
socorroenis, 191
Oedicnemus, 27
bistriatus, 25
Oil, menace to water birds, 128
Old-squaw, 112
Onychorhynchus mexicanus fraterculus, 126
Oporornis tolmiei, 199
Oreortyx picta plumifera, 64, 65
Oreospiza chlorura, 64, 65, 66, 199
Oriole, Baltimore, 147
Bullock, 199
Orchard, 147
Oroscoptes montanus, 199
Ortega, James L., a hybrid flicker, 121
Osprey, 53, 194
American, 70, 206, 242
Ostinops montezumae, 228
Otocoris alpestris enertera, 70, 206, 240
alpestris insularis, 70
alpestris leucolaema, 124, 198
Otus asio gilmani, 26
asio quercinus, 77
cooperi, 26
Ouzel, Water, 199
Owl, 207
Acadian, 17
American Barn, 70
American Hawk, 167
Barn, 17, 198, 246, 274
Barred, 17
Burrowing, 17, 70, 156, 198, 231
Elf, 17
Great Grey, 17
Great Horned, 17, 245
Hawk, 17
Horned, 114, 169, 269
Long-eared, 17
Northern Spotted, 150
Pacific Horned, 65
Pigmy, 17, 161, 162
Sanford Elf, 157
Saw-whet, 161
Screech, 17, 65, 77, 78
Short-eared, 17, 156, 200
Snowy, 17
Spotted, 123, 159, 160
Western Horned, 198
Oxyechus vociferus, 69, 197
vociferus vociferus, 25
Oyster-catcher, 51
Black, 51, 52, 70, 80, 194, 248
Frazar, 70, 194, 206, 243

P

Pagolla wilsonia beldingi, 49, 194, 242
Pandion haliaëtus carolinensis, 53, 70, 194, 206, 242
Parapavo, 150
Parauque, 80
Partridge, European, 167
Passer domesticus, 81, 82, 199
Passerculus beldingi, 56, 57
beldingi halophilus, 57, 195
halophilus, 56, 57
rostratus, 195
rostratus guttatus, 70, 157
rostratus halophilus, 157, 241
rostratus rostratus, 56, 157
Passerella iliaca altivagans, 125, 154
iliaca canescens, 128, 154
iliaca fuliginosa, 114
iliaca fulva, 154
iliaca mariposae, 65, 125
iliaca megarhynchus, 125, 154
iliaca monoensis, 125, 154
iliaca schistacea, 19, 125, 154
iliaca sinuosa, 125, 154
iliaca stephensi, 154
iliaca townsendi, 114
iliaca unalaschcensis, 125, 154
Passerina cyanea, 159

Pelecanus californicus, 69, 163, 247
erythrorhynchos, 253
occidentalis californicus, 193, 240
Pelican, 65, 232
California Brown, 67, 69, 163, 193, 240, 243, 246
White, 253
Pelidna alpina sakhalina, 156, 240
Pemberton, J. R., the American gull-billed tern breeding in California, 253
Penguin, 228
Galapagos, 229, 232
Penthestes gambeli abbreviatus, 63, 65
Petrel, 200, 231
Black, 190
Diving, 229
Hornby, 230
Least, 72, 190, 230
Socorro, 191
Petrochelidon albifrons albifrons, 104
lunifrons, 199
Pewee, Western Wood, 64, 65, 90, 271
Wood, 147
Phaeopus hudsonicus, 242
Phaëthon, 192
aethereus, 191
Phainopepla, 196, 199
Phainopepla nitens, 196, 199
Phalacrocorax ater, 182, 274
auritus albociliatus, 40, 69, 193, 206, 243
auritus cincinatus, 59
auritus floridanus, 273
carbo, 182
fuscescens, 182, 274
pelagicus resplendens, 193
pelagicus robustus, 59
penicillatus, 69, 193
varius, 182
vigua, 26
Phalaenoptilus nuttalli, 198
nuttalli californicus, 26
nuttalli nitidus, 76
nuttalli nuttalli, 26
Phalarope, Wilson, 82
Pheasant, Ring-neck, 118
Phoebe, 147
Say, 70, 159, 198
Pica pica hudsonia, 198, 244, 249
Picoides arcticus, 271
Pierce, Wright M., nesting of a pair of red-shafted flickers, 158
Pierce, Wright M., and Sumner, E. L., Jr., new records from Big Bear Lake, San Bernardino mountains, California, 82; some results of removing banded birds to a distance, 115
Pigeon, Band-tailed, 121
Northern Band-tailed, 124, 153
Passenger, 224, 273
Pinaroloxias inornata, 230
Pinicola enucleator californica, 63, 65
Pintail, 115, 253
Pipilo aberti, 199
maculatus montanus, 199
Pipit, American, 243
Piranga, 18
hepatica oreophasma, 154
ludoviciana, 65, 154, 157, 199
Pisobia bairdi, 58, 156, 202
maculata, 128
minutilla, 69, 197, 206, 242
ruficollis, 200, 274
Pitangus sulphuratus derbianus, 73
Pittman, H. H., the black terns of Saskatchewan, 140
Planesticus, 18
migratorius caurinus, 60
migratorius propinquus, 64, 65, 66, 200
Plover, American Black-bellied, 69, 240
American Golden, 203
Black-bellied, 203
Belding, 49, 194, 242
Belding Wilson, 49
Mountain, 69, 70
Semipalmated, 14, 69
Snowy, 49, 69, 194
Thick-kneed, 25, 26
Western Snowy, 242
Wilson, 49
Pluvialis dominica dominica, 203
Podilymbus podiceps, 155
Pooecetes gramineus confinis, 199
Poor-will, 76, 198
California, 28
Nuttall, 28
Porzana carolina, 194
Potter, Laurence B., correct portraiture of some birds, 200; freak nesting site of a magpie, 249
Progne subis hesperia, 157
Ptarmigan, Alaska Willow, 213
Rock, 12, 113
White-tailed, 204, 226
Willow, 113
Ptychoramphus aleuticus, 68, 188, 206
Puff-bird, 73
Puffinus griseus, 119
opisthomelas, 68, 119, 190, 240
Pyrocephalus rubinus mexicanus, 196, 198

Q

Quail, 74, 237
California, 271
California Valley, 164
Gambel, 196, 197
Mountain, 64, 65, 108
Valley, 235
Querquedula cyanoptera, 197

R

Rail, 47
Belding, 241, 243
California Clapper, 259

Rail [continued]
Carolina, 142
Clapper, 194
Light-footed, 194
Sora, 194
Virginia, 156, 243
Rallus beldingi, 47, 48, 241
levipes, 47, 194
obsoletus, 259
virginianus, 156, 243
Ransom, Webster H., rare hybrid goose taken in Washington state, 170
Raven, 54
Clarion Island, 70
Western, 195, 206, 243
Recurvirostra americana, 197
Redhead, 197, 253
Redpoll, 114
Redstart, 147
American, 77, 157
Painted, 77
Redtail, 249
Regulus calendula, 20, 200
calendula cineraceus, 64, 65
satrapa olivaceus, 19, 82
Ridgway memorial, 83, 172
Rissa tridactyla pollicaris, 58
Road-runner, 75, 196, 198, 273
Robertson, John McB., some incidents in the life of a screech owl, 77; lark bunting in Orange county, California, 203
Robin, 147, 162, 227
Western, 64, 65, 66, 163, 200
Rough-leg, Ferruginous, 249, 263, 268
Rowan, William, an Alberta aviary, 133

S

Salpinctes obsoletus, 195, 199
obsoletus obsoletus, 157
obsoletus pulverius, 165
Saltator, 80
grandis, 80
Sanderling, 69, 156, 242
Sandpiper, Baird, 156, 202
Least, 69, 197, 200, 206, 242
Pectoral, 128
Red-backed, 156, 240, 242
Rufous-necked, 200, 274
Solitary, 80, 112, 118
Spotted, 66
Western, 69, 242
Western Solitary, 156
Sapsucker, Pacific Williamson, 124
Sierra Red-breasted, 65, 153
Williamson, 65, 153
Yellow-bellied, 147
Sayornis saya, 159, 198
Sayornis saya saya, 70
Scaup, Greater, 112
Lesser, 112
Schneider, Frances B., invasion of the southern California coast by elegant terns, 71
Scoter, Surf, 243
Sefton, J. W., Jr., least petrel added to the California list, 72; the ancient murrelet at San Diego, with a note on the behavior of brown pelicans, 163
Seiurus noveboracensis, 118
Selasphorus alleni, 203
rufus, 71
Setopagis parvulus, 26
Setophaga picta, 77
ruticilla, 157
Shaw, Tsen-Hwang, and J. Grinnell, review of Kuroda's birds of Fujiyama, 173
Shearwater, Black-vented, 67, 68, 70, 119, 163, 190, 240
Sooty, 119, 232
Sherwood, Wm. E., an English sparrow deceived, 163; feeding habits of Lewis woodpecker, 171
Shoveller, 253
Shrike, 75, 227, 240
California, 78, 79
Eversmann, 205
White-rumped, 78, 79, 199
Sialia currucoides, 64, 65, 66, 154, 200
mexicana bairdi, 200
mexicana occidentalis, 165
Siskin, 207
Pine, 65
Sitta canadensis, 65
carolinensis aculeata, 65
Skinner, M. P., new additions to the Yellowstone Park list of birds, 203
Skua, 183
Sloanaker, J. L., additional records of the gray gyrfalcon in Washington, 158
Smith, Austin, account of the discovery of a rare bird in Costa Rica, 73; rapid decomposition in some species of the genus Saltator, 80; the water-thrush (Seiurus noveboracensis), the initial species in the autumnal migration through Costa Rica, 118; the Colombian royal flycatcher (Onychorhynchus mexicanus fraterculus) in the Caribbean watershed in Costa Rica, 126; a woodpecker destructive to cacao fruit, 166
Smith, Charles Piper, the olive-sided flycatcher and coniferous trees, 120
Snipe, Wilson, 79, 80, 163, 197
Snowflake, 16
Solitaire, Townsend, 65
Sparrow, Abreojos Large-billed Marsh, 241
Alberta Fox, 125, 154

Sparrow [continued]
Belding, 57
Belding Marsh, 56
Bell, 121
Black-chinned, 157
Chipping, 81
Desert Black-throated, 70
Desert Song, 199
English, 81, 82, 102, 162, 199
Field, 146
Gambel, 98, 199, 275
Golden-crowned, 75, 154, 237
Harris, 102, 145, 146, 147
Intermediate, 12
Lagoon, 56, 57
Laguna Marsh, 55, 157
Large-billed, 55, 56, 195
Leconte, 145
Lincoln, 66, 145, 157
Mariposa Fox, 108
Marsh, 56, 195, 242
Mono Fox, 125, 154
Pacific Chipping, 81
San Lucas Marsh, 70
Santa Cruz Song, 274, 275
Savannah, 146
Shumagin Fox, 154
Slate-colored Fox, 19, 125, 154
Song, 146, 275
Sooty Fox, 114
Thick-billed Fox, 125, 154
Tree, 138, 146
Valdez Fox, 125, 154
Vesper, 147
Warner Mountains Fox, 154
Western Chipping, 64, 65, 66, 157, 199
Western Lark, 147
Western Vesper, 199
White-crowned, 63, 66, 99, 145, 153
White Mountains Fox, 125, 154
White-throated, 159
Yosemite Fox, 65, 125
Speotyto cunicularia hypugaea, 70, 156, 198
Sphyrapicus thyroideus, 153
thyroideus thyroideus, 65, 124
varius daggetti, 65, 153
Spinus pinus pinus, 65
Spiza americana, 157
Spizella atrogularis, 157
passerina arizonae, 64, 65, 66, 81, 157, 199
passerina passerina, 81
passerina stridula, 81
Spoonbill, Roseate, 253
Sprot, G. D., notes on the courtship of the rufous hummingbird, 71; an American hawk owl record for Vancouver Island, 167
Squatarola squatarola, 203
squatarola cynosurae, 69, 240
Steele, Ed. S., food of the spotted owl, 123
Steganopodes, 142
Steganopus tricolor, 82
Stellula calliope, 19, 63, 66, 124
Stercorarius parasiticus, 58, 243
pomarinus, 58
Sterna antillarum antillarum, 39
antillarum browni, 39, 155, 190, 243
caspia, 32
caspia imperator, 190, 254
elegans, 36, 71, 171
forsteri, 155
hirundo, 155
maxima, 32, 68
Stilt, Black-necked, 82, 253
Stint, Asiatic, 227
Storer, Tracy I., three notable nesting colonies of the cliff swallow in California, 104
Strix, 27
occidentalis, 123, 159
occidentalis caurina, 160
occidentalis occidentalis, 26
varia alleni, 25, 26
Struthio, 27
camelus, 26
Sturnella neglecta, 157, 160, 199
Sula brewsteri, 155, 192
nebouxii, 155, 193
Sumner, E. L., Jr., and Wright M. Pierce, new records from Big Bear Lake, San Bernardino mountains, California, 82; some results of removing banded birds to a distance, 115
Surf-bird, frontispiece, 3
Surnia, ulula caparoch, 167
Swallow, 227
Barn, 105, 199
Cliff, 104, 199
Tree, 63, 66
Violet-green, 90
Swarth, H. S., review of Birds of western Canada by P. A. Taverner, 82; review of check-list of the birds of Australia, 129; valley quail imported from Chile, 164; birds of the Atlin region, British Columbia: a reply to criticism, 169; the rufous-necked sandpiper on St. Paul, Pribilof Islands, 200; Eversmann shrike not a North American bird, 205; the rufous-necked sandpiper in Alaska, 274
Swift, Black, 89
White-throated, 93
Synthliboramphus antiquus, 163

T

Tanager, 228
Arizona Hepatic, 154
Western, 65, 154, 157, 199

Tanner, Vasco M., notes on birds collected in the Virgin river valley of Utah, 196
Tate, Ralph C., the American magpie in the Oklahoma panhandle, 244
Tattler, Wandering, 6, 14, 16, 69, 156
Taylor, Mrs. H. J., the Allen hummingbirds in Golden Gate Park, 203
Teal, Cinnamon, 197
Green-winged, 197
Telmatodytes palustris plesius, 199
Teratornis, 150
Tern, American Gull-billed, 253
Black, 140, 155, 253
Brown Least, 38, 49, 155, 190
California Least, 243
Caspian, 32, 33, 155, 190, 254
Cassin, 228
Common, 155, 171
Coues Caspian, 240, 243
Tern, Elegant, 36, 68, 71, 171, 189
Forster, 71, 155, 253, 254
Least, 39
Royal, 32, 34, 35, 36, 37, 68, 171, 189, 240, 243
Thalasseus elegans, 189
maximus, 189, 240
Thrasher, Brown, 147
Sage, 199
Trinidad Crissal, 127
Thrush, Audubon Hermit, 19
Babbling, 228
Northern Varied, 19, 154
Olive-backed, 147
Red-legged, 228
Russet-backed, 66, 154
Sierra Hermit, 64, 65
Varied, 204
Willow, 20
Thryomanes bewickii leucophrys, 160
Titmouse, 237
Totanus flavipes, 164
melanoleucus, 242
Toucan, 228
Towhee, Abert, 199
Arctic, 146, 147
California, 236, 237
California Brown, 74
Green-tailed, 64, 65, 66, 199
San Francisco, 237
Spurred, 199
Townsend, Charles Haskins, old times with the birds: autobiographical, 224; portraits of, 227, 231
Toxostoma crissale crissale, 127
crissale trinitatis, 127
Tree-duck, Fulvous, 253
Tringa damacensis, 227
solitaria, 112
solitaria cinnamomea, 112, 156
virgata, 3
Troglodytes aedon parkmani, 199
Trogon, 228
Tropic Bird, 191
Red-billed, 191
Turnstone, Black, 70, 206
Common, 70
Ruddy, 240
Tyrannus crassirostris, 18
cubensis, 18
dominicensis, 18
melancholicus, 18
tyrannus, 18
verticalis, 18, 82, 198, 203
vociferans, 18
Tyto alba pratincola, 70, 198, 246, 274

V

Van Rossem, A. J., eye-shine in birds with notes on the feeding habits of some goatsuckers, 25; a new race of Sclater oriole, 75; the Arizona race of the sulphur-bellied flycatcher, 126
Vermivora celata celata, 157
celata lutescens, 64
ruficapilla gutturalis, 65
Vireo, 18
Bell, 147
Cassin, 64, 65
Western Warbling, 64, 66, 199
Vireo solitarius cassini, 64, 65
gilvus swainsoni, 64, 66, 199
Von Bloeker, Jack C., a strange meeting with a flicker, 200
Vulture, Northern Turkey, 243
Turkey, 153

W

Wales, Joseph H., fearlessness of shearwaters, 119
Walker, Alex., additional records of the prairie falcon in the Willamette valley, Oregon, 118
Warbler, 207
Audubon, 19, 64, 65, 70, 108, 115, 199
Black-and-white, 128, 157
Calaveras, 65
Cerulean, 126
Golden Pileolated, 64, 66
Hermit, 64, 65
Kirtland, 227
Lutescent, 64
Macgillivray, 199
Mangrove, 195, 241, 243
Orange-crowned, 140, 157, 241
Pileolated, 19
Sonora Yellow, 199
Tolmie, 161, 162
Western Fan-tailed, 126
Yellow, 147, 162, 241
Water-fowl, monthly census of, 250
Water-thrush, 118, 227

Wetmore, Alexander, a method for keeping notes and files dealing with ornithology, 109; the amount of food consumed by cormorants, 273
Weydemeyer, Winton, notes on the location and construction of the nest of the Calliope hummingbird, 19; some new birds from western Montana, 159
Whip-poor-will, 17, 18, 25, 27
Willett, G., notes on the occurrence and distribution of some southeastern Alaskan birds, 58
Willet, Western, 69, 240, 242
Williams, Laidlaw, notes on the black oystercatcher, 80; California brown pelicans nesting at Point Lobos, Monterey county, California, 246
Wilsonia pusilla chryseola, 64, 66
pusilla pileolata, 19
Wood-hewer, 229
Woodpecker, 112, 236
Arctic Three-toed, 271
Arizona Gila, 169
Cactus, 198
California, 233
Downy, 147
Gila, 162, 168
Hairy, 162
Lewis, 124, 165, 171, 198
Modoc, 65
Northern White-headed, 65
Red-headed, 147
San Fernando Gila, 168, 169
San Lucas Gila, 169
Southern Downy, 147
Willow, 161, 162
Woods, Robert S., road-runner versus mockingbird, 273
Wren, 231
Canyon, 94, 157, 199
Cape Horn, 229
Carolina, 147
Marsh, 229
Rock, 144, 157, 165, 195, 199
San Clemente, 160
Texas, 147
Western House, 147, 199
Western Marsh, 199
Western Winter, 20
Wren-tit, 121
Wright, William S., a protective container for school specimens, 72
Wyman, L. E., the Derby flycatcher near Los Angeles, 73
Wythe, Margaret W., some birds of the Gold lake district of the Sierra Nevada, California, 61

X

Xanthocephalus xanthocephalus, 198
Xema sabini, 59, 73
Xenopicus albolarvatus albolarvatus, 65

Y

Yellow-legs, 164, 165
Greater, 242
Yellow-throat, Maryland, 147
Western, 199

Z

Zenaidura macroura marginella, 198
Zonotrichia albicollis, 159
coronata, 154
leucophrys gambelii, 98, 199
leucophrys leucophrys, 63, 66, 99, 153
querula, 102

For Sale, Exchange and Want Column.—Any Cooper Club member is entitled to one advertising notice in each issue free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address W. LEE CHAMBERS, *Drawer 123, Eagle Rock, California.*

WANTED—For Cash: The Auk, vols. 1 to 10; THE CONDOR, vols. 1 to 8 and 21 to 28, also vol. 6 no. 6; Bird-Lore, vols. 1, 2, 3, or parts, also vol. 7, no. 1, vol. 9, no. 6, vol. 11, nos. 1-5, vol. 14, no. 2; Bent's Life Histories, Bulletin no. 107; Brewer's North American Oology; Forbush, Birds of Massachusetts and other New England States, vol. 1. Have many duplicate copies of Bird-Lore for exchange for those I need, or will pay cash.—W. H. BROWNHALL, *Stockport, Ohio.*

WANTED—To buy first class bird skins of the following families and orders: Anatidae, Columbae, Limicolae, Gallinae, Rallidae; especially foreign species. Address—H. B. CONOVER, *6 Scott St., Chicago, Ill.*

FOR SALE—Traps for bird banders. W. B. B. A. supply. Last word in traps. Folding 4-compartment Potter Trap, $5. Top-opening Warbler Trap, automatic, $5. Trap doors, consisting of door, frame and tripping treadle, 60c each. — WESTERN BIRD BANDING ASSOCIATION, *418 Elm Ave., Pasadena, Calif.*

WANTED, FOR CASH—THE AUK, vols. 1-12; vol. 13, no. 3; vol. 14; vol. 15, nos. 1, 2, 4; vol. 16, nos. 2, 3, 4; vol. 17; vol. 26, no. 1; vol. 36. If you have any of these, in original paper covers, perfect, clean and untorn, please state price.—CHARLES F. BATCHELDER, *Peterborough, New Hampshire.*

FRENCH OR GERMAN FIELDGLASSES, $5 up; stereo-prism binoculars, 8-power, $15 up. Mirakel 3 oz. universal focus monoculars with 20-power attachment that converts it into a microscope; 3½-power $10; same in 5-power $12.50. Watch for the new Mirakel 7-power, 7 oz. binocular, $35. Everything in glasses from a Zeiss down. Satisfaction guaranteed after trial, or money refunded.—J. ALDEN LORING, *Box O 182, O-we-go, Tioga Co., N. Y.*

FOR EXCHANGE—Duplicate copies Nuttall Bulletin; The Auk and many of the early minor bird magazines; standard and unusual works on ornithology; complete set Bent's Life Histories; several good local lists including *original* Roosevelt and Minot. Can use Baird, Brewer and Ridgway's Water Birds, Hearne's Journey, and other *early* North American Explorations. — C. J. PENNOCK, *Kennett Square, Chester Co., Pa.*

NOW ON THE MARKET — New French pocket prism binocular, 6-power, 11½ oz. weight, 25 mm., 110 yds. field, wheel and right eye cap focus, solid leather combination pocket and shoulder slung case with two straps; $16. Have a few used fieldglasses and prism binoculars, including Mirakel 5-power; in perfect condition, satisfaction guaranteed. Pocket microscopes, 25-power $1, 50-power $4. Loupes, Coddington and tripod from 40 cents upward. —J. ALDEN LORING, *Box O, O-we-go, Tioga Co., N. Y.*

COOPER CLUB PUBLICATIONS

For Sale by

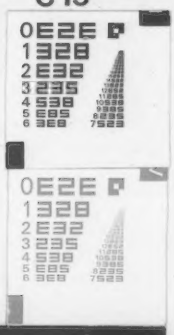
W. LEE CHAMBERS, Drawer 123, Eagle Rock, Los Angeles, California

PACIFIC COAST AVIFAUNA

No. 6. Index to the Bulletin of the Cooper Ornithological Club, vol. 1 (1899), and its continuation THE CONDOR, vols. II (1900) to X (1908), by Henry B. Kaeding; 1909, 48 pp. Price $3.00 post paid.

No. 13. Second Ten Year Index to THE CONDOR, vols. XI-XX, 1909-1918, by J. R. Pemberton; 1919, 92 pp. Price $3.00 post paid.

These two volumes are obviously necessary to the completion of a file of THE CONDOR. In the "Second Ten Year Index" information is segregated by species under all the different names employed, by authors, by states and countries, in California by counties, and by subject matter.


C15